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AN INDEX OF PROGNOSIS

AND

END-RESULTS OF TREATMENT

AN

INDEX OF PROGNOSIS

AND END-RESULTS OF TREATMENT

BY

VARIOUS WRITERS

Edited by

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SECOND EDITION, REVISED AND ENLARGED.

BRISTOL: JOHN WRIGHT AND SONS LTD.
LONDON: SIMPKIN, MARSHALL, HAMILTON, KENT & CO. LIMITED.
TORONTO: THE MACMILLAN COMPANY OF CANADA LTD.

1918

JOHN WRIGHT AND SONS LTD.
PRINTERS AND PUBLISHERS, BRISTOL, ENGLAND

PREFACE TO SECOND EDITION

THE second edition has been extensively revised throughout, and contains a number of new articles. The account of *Tropical Diseases* has been re-written by Sir Leonard Rogers. Other fresh material includes articles on *Tetanus*, *Gas Gangrene*, *Septic Peritonitis*, and *Gunshot Wounds*.

It is probable that a certain amount of recently published literature that might have been made use of for an even more thorough revision has not been included. For this and other shortcomings we must plead in extenuation that the editor and many of the contributors are serving overseas.

A. RENDLE SHORT.

B. E. F., France.

PREFACE

THIS volume is issued as a companion to the *Index of Treatment* and *Index of Differential Diagnosis* brought out by the same publishers. Its principal aims are:

(1) To set forth the results, and particularly the end-results, of various methods of treatment, in such a form as will enable the practitioner to obtain a fair, unbiassed, reasoned opinion as to the prospects of securing for his patient permanent relief, and the risks of such treatment.

(2) To furnish data by means of which, apart from the question of treatment, one may seek to arrive at an accurate forecast of what will probably happen to the individual patient.

Although the art of prognosis is vitally important—and nearly every intelligent patient, or his friends, will ask for an opinion as to his prospects, and will judge of the capacity of the medical attendant by the accuracy of that opinion—it is extraordinary to find how little help is given by current text-books. Especially is it difficult to find reliable data as to the end-results of treatment, more particularly surgical treatment. Even large monographs on special diseases, though they usually advise certain measures, only express a pious opinion as to the probable results thereof, unsupported by any trustworthy figures.

The compilation of the present *Index* has, therefore, been extremely laborious, because a painstaking search through the wilderness of modern medical literature in several languages has often yielded very small results. The editor has found it necessary to supplement the published records by investigating the end-results of treatment at the Bristol Royal Infirmary—upwards of a thousand patients having been communicated with for this purpose; and other contributors have also taken great trouble to acquire, from their private or hospital practice, the necessary figures.

The only way to express end-results in such a manner as to give authoritative guidance is by quoting statistics. Thus alone can the practitioner, unless his personal experience is far wider than ordinary, verify or qualify the promises of an enthusiastic specialist.

Published end-results have been calculated on various systems, and may be hopelessly unreliable. Sometimes, for instance, the cases are too few to warrant generalization. Very many figures are vitiated by too early reporting; patients with cancer, for example, having been followed up for a year or two only.

There are three principal classes of statistics: (1) Reports culled from the literature: (2) The records of individual surgeons: and (3) Studies of hospital cases published by registrars or others. Pickings from the literature are often absolutely misleading, because successes and curiosities have been selected for publication, while failures are unmentioned. The records of individual surgeons are sometimes touched with *couleur de rose*. Hospital figures are the most reliable, but are usually less favourable than the results obtained in private practice, where patients are naturally better able to look after themselves.

Throughout this book, therefore, careful note is taken of the source of the information, and its relative value is taken into account in the summing up. We believe, moreover, it will be found that the figures are so presented that they do not unduly obtrude themselves, or confuse the plain and simple conclusions of the text which accompanies them.

Lastly, this volume is unique; nothing of similar character has appeared before or can compare with it. It therefore possesses a value entirely its own, and one which time will not diminish. Should it find sufficient favour with practitioners for further editions to be called for in the decades to come, the present compilation will yet maintain its position as a register of the progress of the healing art up to the time of its appearance—a date memorable in the world's history as that of the Great War.

It will be for the future to improve upon the end-results of treatment here recorded, which at the time of writing have attained "thus far, but no farther."

A. RENDLE SHORT.
(*Editor.*)

June, 1915.

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[illegible]

AN INDEX OF PROGNOSIS

AND PRINCIPLES OF TREATMENT

ABDOMEN, GUNSHOT WOUNDS OF. (See GUNSHOT WOUNDS.)

ABDOMINAL INJURIES.—We have to consider the consequence of (1) Blows on the abdomen; (2) Punctured wounds. It will be necessary to set these forth according to the viscera which may be injured.

1. **Contusions.**—After a severe blow on the abdomen, the patient is usually seen within a few hours by a medical man, and the diagnosis and prognosis at first are often very difficult. Such injuries as a kick by a horse, buffer accidents, and cases where a vehicle has run over the abdomen, are always to be regarded as entailing very serious possibilities, because great force may have been localized upon a small area. It is extremely important to realize that the degree of shock when the patient is first seen is most misleading as a guide to diagnosis or prognosis. Thus, on the one hand, to take an extreme case, a powerful athlete may die outright as a result of a blow over the solar plexus, without any laceration of abdominal viscera whatever. An area the size of a half-crown is well known to pugilists as the 'mark,' where a hard punch will induce instantaneous shock. If the injured person does not die at once, however, he will almost certainly recover completely, provided that the contusion of the abdomen has not ruptured any important viscera or vessels.

On the other hand, the prevalent impression that after rupture of one of the important organs the patient's pulse will necessarily be quick and feeble, is misleading to the last degree, and many reputations have suffered because the doctor has seen a patient soon after the injury, and, trusting to the normal pulse and absence of shock, has sent him home with a good prognosis, whereas six hours later he was dying of internal hæmorrhage. Most hospitals have tragic stories to tell of this calamity. Ruptured spleen is particularly apt to lie hidden in this way. In a series of 15 cases of rupture of various abdominal viscera studied by the writer, in only 4 was the pulse over 100 when first seen, and these four all died within twenty-four hours.

It ought to be well recognized that prognosis is absolutely impossible within a few hours of a severe injury of the abdomen, unless, of course, the patient is already obviously dying. Even if there are no symptoms whatever he ought to be put to bed and carefully watched, the pulse

[illegible] for several hours. It is usually possible to prepare [illegible] warm in bed, and given hot applications for the [illegible] that the condition remains or becomes [illegible] Morphia ought not to be given [illegible]

On the other hand, if [illegible] the condition will [illegible] nt. The pulse [illegible] the face becomes anxious, [illegible] rigidity of the abdominal wall. The temperature may be abnormal. Vomiting [illegible] : even slight hæmat- [illegible] In a case under the writer's [illegible] a boy recovered without further [illegible] in the abdomen, or the pallor and air- [illegible] very grave signs. In [illegible] dullness in the left flank and shifting [illegible] liver dullness is of no importance.

Such signs as they [illegible] to be detected after watching the patient for [illegible] and may, of course, be evident much [illegible] operation. In our experience at the Bristol Royal Infirmary, [illegible] in diagnosis in cases thus [illegible] it is often impossible to tell what organ is diseased.

One possible [illegible] the abdomen well deserves notice. The [illegible] illustrating it. After a contusion of the [illegible] appendicitis may come on rapidly. In the first case [illegible] there was pain, tenderness, and [illegible] but the patient looked well, the pulse was normal, and he walked [illegible] to the hospital. The local signs were attributed to the blow the day before, and the lad was told to rest at home. Two days later he was admitted with appendicitis and general peritonitis, and died. In the second case, the condition when first seen was exactly similar, but the temperature was taken, and found to be raised. The boy was operated on, and recovered well. The temperature is the clue to the very obscure case.

Rupture of Intestines.—We are greatly indebted to the careful study of Rose and Griscelli on 132 cases, being the total number treated in London hospitals from 1893 to 1907. The writer has been able to trace 6 cases treated in the Bristol Royal Infirmary (1900–1912).

TRAUMATIC RUPTURE OF INTESTINES.

London Hospitals	48	44	4	= 8%	84	67	17	= 20
Bristol Royal Infirmary	1	1	0		5	1	4	

Many of the patients, of course, were admitted moribund, or had fractured pelvis or spine. Apart from operation, death usually ensued within twenty-four hours; one patient lived ten days.

The best results were obtained by early operation, which means within twelve hours. All the Bristol successes were treated from four to six hours after injury; of the London cases, 13 out of 33 operated on within twelve hours recovered, but only 1 after the lapse of twenty-four hours.

As regards site of the injury, duodenal tears were almost invariably fatal.

It will be observed that, even apart from operation, 4 cases recovered on which abscesses or obstruction, developing subsequently, showed that rupture had occurred. One patient got well without operation who was thought too ill to have anything done!

After successful suture, the great majority of the cases seem to remain quite well. Of the Bristol cases, 3 were examined long afterwards, and had no trouble except a slight incisional hernia in 1 case. 2 of these were seen by the writer six and eight years after the operation. A few of the London cases returned for obstruction or abscesses.

Ruptured Liver.—Recent data concerning this injury are not easy to obtain. The writer has abstracted the records of 10 cases treated at the Bristol Royal Infirmary, of whom 6 were operated on and 2 recovered. One of the latter had a small tear, and was not diagnosed for two days. The other recovery was operated on after five hours.

Adding together the statistics during ten years in the Bristol series, and five years at St. Thomas's and the Middlesex Hospitals, one obtains a record of 18 cases operated on, of which 12 died and 6 recovered.

Tilton reports the figures from a ten New York hospitals during 1895 to 1905, whereof 7 out of 12 died and 5 recovered.

Ruptured Spleen.—This injury is less common than the above. The dangerous tendency to produce no alarming symptoms for several hours has already been mentioned.

Laspeyres has found in the literature 58 cases of splenectomy for rupture, of which 39, or 67·2 per cent, recovered; but such records are likely to be far too favourable, as deaths are less written up than successes.

Putting together the figures for the Bristol Royal Infirmary and St. Thomas's and the Middlesex hospitals, one finds 15 cases with 9 deaths and 6 recoveries.

Ruptured Pancreas.—This appears to be a rare injury: two large London hospitals had no case in five years. At the Bristol Royal Infirmary there have been 2 recent cases; 1 died, the other recovered, and was well four years later. The fatal case furnishes an instance of a common sequel, namely, severe self-digestion of the tissues leading to subphrenic abscess. Mikulicz in 1903 collected from the literature 24 cases, of which 13 died without operation, and of the 11 operated on 7 were cured.

Pancreatic cyst has followed injury of this gland

[illegible] Kidney.—Bedell has [illegible] to the several tables of statistics collected by [illegible] from hospital reports jointly, and therefore probably rather too favourable. Probably the same cases [illegible] The most useful figures are those of Dellet and Watson, which are as follows. It will be observed that [illegible] of those submitted [illegible] but about 5 per cent of [illegible] of the kidney.

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dellet	[illegible]	[illegible]	[illegible]	50	2	4	44	11	25
Watson	273	81	30	99	7	7	115	25	22

When the only evidence is a transient hæmaturia, the patients make a perfect and complete recovery.

When there is in addition a swelling in the loin, but no tear of the ureter and no early shock or hæmorrhage, the outlook is good. Three cases seen by the writer became [illegible] afterwards, had continued quite well.

Marked signs of shock make a bad prognosis, whether the effusion of blood is into the loin or into the peritoneum. Two such cases at the Bristol Royal Infirmary treated by nephrectomy both died. Laceration of the renal pelvis or ureter leads to leakage of urine or hydronephrosis, which may [illegible] separate, when the outlook becomes very grave. The outlook in children is serious; according to Maas, 85 per cent die.

Rupture of Bladder.—This is not very common. Two large London hospitals had no cases in five years. Of 6 cases at the Bristol Royal Infirmary, only 1 recovered, but usually the operation was undertaken too late to give the patient a chance. There can be no doubt that if there are no severe injuries besides, and no cystitis is present, early diagnosis would save a larger proportion. One man fell into a ditch whilst intoxicated, and ruptured his bladder into the peritoneum. He was treated by a doctor in the country for a week: sometimes he passed water himself, and sometimes a catheter was used. He was up and about most of the time. On admission, the abdomen was greatly distended; at the operation, 13 pints of urinous fluid were evacuated, and twelve sutures were necessary to sew up the rent in the bladder. He died, but could no doubt have been saved by earlier operation.

Collections of isolated cases from the literature, such as Quick's and Ashhurst's, are quite unreliable in estimating the true mortality, because fatal cases so often fail to get into print. The latter reports 22 cures out of 29 cases operated on by various writers since 1893.

2. **Perforating Wounds.**—It is not possible to say much about the

prognosis of stab wounds of abdominal viscera, because so much depends upon the circumstances and upon early operation. Given prompt diagnosis and treatment, the majority of the cases ought to recover, just as a perforated gastric ulcer usually does; but a few hours' delay, or even late beyond twelve hours, will seriously jeopardize the patient's chances. When the signs of widespread peritonitis are present, the outlook is very grave, but by no means hopeless.

Statistics are not easy to obtain. Tilton reports that of 13 cases of stab or shot wound of the liver from 6 New York hospitals, 4 died and 9 recovered. The prognosis is, of course, much better than that of contusion.

REFERENCES.—Rendle Short, *Lancet*, 1911, ii, 818; Berry and Giuseppe, *Proc. Roy. Soc. Med.* (Surg. Sect.), 1909, iii, 1; Tilton, "Ruptured Liver," *Ann. Surg.* 1905, 20; Lespinasse, *Centr. Chirurg.* 1905, xii, 152; Quick, "Ruptured Bladder," *Ann. Surg.* 1907, xlv, 94; Beall, *Med. Rec.* 1913, lxxxiii, 64.

A. Rendle Short

ABSCESS, SUBPHRENIC.—(*See* SUBPHRENIC ABSCESS.)

ACCESSORY SINUSITIS OF THE NOSE.—(*See* NASAL ACCESSORY SINUSITIS.)

ACIDOSIS.—The prognosis of acidosis depends more on its cause than on its intensity, though, *cæteris paribus*, the degree of the latter is a most important item. The most common conditions in which it occurs are diabetes mellitus, starvation, sudden withdrawal of carbohydrate food, after some anæsthetics, during febrile diseases, in the toxæmic vomiting of pregnancy, the cyclic vomiting of children, and in phosphorus poisoning. Although many factors, including the administration of mineral acids, may lead to diminished alkalinity of the juices of the body, and so produce a state of acidosis, here we are not referring to such conditions, but to an acid intoxication set up by the presence of β-oxybutyric acid, diacetic acid, and acetone. To this form of poisoning children are more susceptible than women and the prognosis is worse in children than in women. Similarly the outlook is worse in women than in men. These substances not only exert a direct toxic effect on the tissues of the body, but also act detrimentally on account of their acid properties. In severe cases they are excreted in very large quantities, and this represents a large quantity of unused fuel, entailing a considerable loss of energy to the body. For purposes of prognosis it is necessary not only to determine the presence of acidosis, but also, so far as is possible, the degree of acid intoxication. By the usual tests the presence of these substances will be proved in the urine. Probably also the odour of acetone in the breath will be obvious.

T. Stuart Hart, in the *Quarterly Journal of Medicine*, has given the following method for estimating the acidosis index. He first demonstrates the presence of acetone by the usual test (Lange's). Secondly he employs the ferric chloride method (Gerhardt's test) to show the

[illegible] acid. He uses the following solutions for the [illegible] index:—

(a) A standard solution consisting of ethyl aceto-acetate 1 c.c. [illegible] distilled water to 1000 c.c.

(b) A [illegible] solution consisting of 100 grams of ferric chloride [illegible] in 100 c.c. of distilled water.

A [illegible] quantity (10 c.c.) of [illegible] and of the urine to be tested is put [illegible] To each of these 1 c.c. of (*b*) is added. After [illegible] the intensity of the colour of [illegible] compared. If the solution in the test tube is lighter than the [illegible] known quantities of distilled water are added to make the tints the same. From the figures [illegible] 'acidosis index per litre' is arrived at.

[illegible]	Gerhardt's test negative	0·5
[illegible]	Gerhardt's test positive	
[illegible]	10 c.c.	1
	20 "	2
	100 "	10

[illegible] proportion.

To obtain the 'acidosis index' the 'acidosis index per litre' is multiplied by the amount of urine in litres passed in twenty-four hours.

The [illegible] 'acidosis index' which can be translated in terms of [illegible] acid. Thus an acidosis index of 10 is equivalent to [illegible] of 10 grams of oxybutyric acid.

Another helpful test is the reaction of the patient's urine to alkalies, such as the sodium [illegible] A patient who requires more than 1 oz. of [illegible] to make his urine alkaline is suffering from acidosis of considerable severity. In a healthy individual 2 drachms [illegible] will keep the urine alkaline for twenty-four hours. If however, a large amount of acid is being formed in the body, the [illegible] will be used up, and be excreted in the form of [illegible] salts, and be used to make the urine alkaline. The amount of [illegible] required to be given to induce [illegible] is also useful in forming a prognosis.

The [illegible] on the blood will also give valuable [illegible] certain that the rest of the [illegible] The method more [illegible] determination of the percentage of [illegible] and the comparison of [illegible] excreted in the form of [illegible] about 5 per cent [illegible] acidosis it not infrequently [illegible] as 40, 50, or even 60 [illegible]

[illegible] excreted in the form of ammonium

and instead of being built up in the body into urea, in order to neutralize the condition of acidosis in the tissues and to save the central tissues of the body.

It must not, however, be assumed that acid intoxication exists because the percentage of ammonia nitrogen excreted in the urine is relatively increased. For this proportion may be raised, not because there is any absolute increase in the amount of ammonia nitrogen, but because there is an absolute decrease in the amount of urea excreted. This not infrequently happens in conditions of partial or total starvation. It has been found that when the urea excretion falls below 7 to 8 gram. in the twenty-four hours, the relative percentage of ammonia nitrogen increases, and that this may occur apart from the presence of organic acids. An absolute or relative increase in the output of ammonia nitrogen must be looked for, if this is to be used as a basis of prognosis. As much as 12 gm. of ammonia nitrogen have been observed to have been excreted in twenty-four hours, being 40 per cent of the total nitrogen excreted.

The total quantity of ammonia excreted forms an indication of the degree of acid intoxication, but not necessarily of the amount of organic acid being simultaneously excreted. For the estimation of this, the test of Hart, mentioned above, forms a very useful guide.

It is of the greatest value to make constant observations on the percentage of the ammonia-nitrogen excretion in any given case. It is often the presence of increasing danger; but the figures so obtained are of little value in comparing one patient with another. For a man may be in fairly good health who is excreting a much greater amount of ammonia nitrogen than one who is in diabetic coma. There appears to be little doubt that acid intoxication is responsible for the coma and other toxic symptoms in diabetes, and kills the patient; but the excretion of acetone bodies may go on for many months without acid intoxication supervening.

In starvation, the condition is different, because, in spite of the fact that the patient suffers from acidosis, he can still assimilate and use carbohydrates if he can get them, and as he still possesses the power of utilizing cleavage carbohydrate derived from his own tissues, he accordingly dies rather from actual deprivation of food than from acid intoxication, a point which makes the outlook, as far as treatment is concerned, much more hopeful than in the corresponding state of diabetes.

In post-anæsthetic poisoning, it must be remembered that the patients have generally been starved, and that in starvation the relative excretion of ammonia is to be estimated, not merely the percentage of the ammonia excretion, as this may appear unduly high, owing to the small amount of urea excreted. The prognosis is much improved if treatment with sodium bicarbonate and glucose is used before the administration of the anæsthetic. Glucose seems to be more effective than the alkali in preventing post-anæsthetic vomiting.

[illegible]

J. R. C.

ACROMEGALY. [illegible] **with eating, and by** [illegible] **patient complains of continuous** [illegible] **blindness, which are found** [illegible] **optic neuritis or atrophy, it is** [illegible]

Prognosis of Operation. [illegible] **situation of the gland** [illegible] **as to reduce the risk of** [illegible] **per cent out of 61 operations: several of** [illegible] **The purpose of the operation** [illegible] **the base of the pituitary** [illegible] **part of the gland was excised** [illegible] **pressure are marked** [illegible] **pressure gives more relief.**

[illegible] **results, von Eiselsberg claims that** [illegible] **relieved of their headaches and** [illegible] **as long as four years after** [illegible]

[illegible] in half of his cases. Both observers [illegible] that the treatment of actinomycosis may close [illegible] on [illegible] in acromegaly and gigantism. In [illegible] the [illegible] of [illegible] is [illegible] followed [illegible].

[illegible] *Lancet*, [illegible] *Diseases* [illegible] *Rev.* [illegible]

ACTINOMYCOSIS.—In a [illegible] that under the clinical term [illegible] are also included, but it is not clear [illegible].

The treatment depends primarily upon two factors—the location of the disease, and the degree of active inflammation which lies superficial to [illegible]. Also the nature of the treatment controls the end result.

Actinomycosis of the Appendix and Cæcum.—This forms a well-defined clinical group, of which the writer has seen 6 cases, and it posted 2 more in the wards of the Bristol Royal Infirmary. Up to [illegible] there were about 150 cases in the literature, of which 27 were British, but it is certain that the real frequency is much greater. In about [illegible] per cent of cases of abdominal actinomycosis this region is involved. The outlook is very grave. Grill reported 77 cases, whereof 22 were [illegible] cured, 19 relieved, and 45 died; but it is probable that this estimate is too favourable in that the cases were not followed long enough. Patients of Gangolphe, Warnot, and Blasko and 2 seen by the writer were apparently cured or relieved for months or years, [illegible] the disease returns[1], in one of the writer's cases after eight years, and death resulted. There are, however, a few authentic cures. The eight Bristol cases all died.

The course of the illness is miserably chronic in the majority of cases, though some have died in a few weeks or months. Beginning [illegible] appendicitis, or occasionally with attacks of diarrhœa, a [illegible] mass gradually forms in the right iliac fossa, and [illegible] through the skin. The pain is not great. [illegible] spreads over the whole abdomen, metastases [illegible] the liver, and usually death from septic absorption [illegible] twelve months. By this time abscesses may [illegible] the bowel, bladder, or other organs, producing faecal or [illegible].

Abdominal Actinomycosis in other Localities.—Next to the right iliac fossa the actinomycosis most commonly affects the liver, and [illegible] the chest wall, as in a case seen by the writer. [illegible] in the abdomen may be absent, but rather [illegible].

The prognosis is unfavourable but not hopeless. Dixon (quoted by [illegible]) gives the death-rate in actinomycosis as 74 per cent., which is probably too pessimistic, as cases taken haphazard from the [illegible] are apt to be.

Actinomycosis of the Face, Jaw, and Tongue.—This is a common [illegible], and a relatively favourable one if the diagnosis is made [illegible]. Huge swelling, with much induration but little pus, [illegible] jaw (usually the lower), but extending widely into the [illegible] or tongue, with a tendency to form sinuses, characterizes the [illegible]. Given efficient treatment, however, it can usually be con- [illegible] months before the patient is well again.

[illegible] frequency in this situation as 11 per cent: here [illegible] is prognostically favourable.

Pulmonary Actinomycosis.—The fungus may attack the lungs, or [illegible] wall, forming a spongy abscess. In either case [illegible]. Hodenpyl collected 34 cases, of which 32 [illegible] months.

Iron reports that cases from the literature show a mortality of 83 [illegible]

Actinomycosis of the Brain. This is rare, and appears to be [illegible].

Actinomycosis of the Skin.—This is a favourable location, and [illegible] the considerable majority of the cases. [illegible].

The Effect of Treatment.—The outlook is most favourable, of course, [illegible] can be undertaken, but actino- [illegible] the appendix has several times recurred in the stump.

Potassium iodide in large doses (240 gr. a day for months at a [illegible] and the United States [illegible] 63 per cent of cases in cattle [illegible] and moulds, are recom- [illegible] but statistics are not available. [illegible] combination of these methods [illegible].

[illegible] "Actinomycosis." Jaron [illegible] A. Rendle Short, *Lancet*, [illegible]
A. *Rendle Short*

ACUTE YELLOW ATROPHY OF THE LIVER.—(*See* LIVER.)

ADDISON'S DISEASE. [illegible]

General Treatment. [illegible]

teristic symptoms survived for ten years, but was in bed for the last eight years. Although open-air treatment has done good, and is reasonable on the ground that most of the cases show tuberculosis of the adrenals, protection from cold and exposure must be insured. Healthy and cheerful surroundings, with sun and warmth, by improving the general health and resistance, have an obvious bearing on the prognosis. In a few instances, of which Gaucher and Gougerot[1] have collected six examples, syphilis appears to be the causal factor, and in these circumstances it is reasonable to hope that improvement will follow careful antisyphilitic medication, but these patients bear mercury badly, and the administration of salvarsan preparations would be an anxious proceeding.

Organotherapy in this disease is very disappointing as compared with the results in myxœdema. A small proportion of cases are permanently benefited or cured, marked improvement occurs in some instances, and that there is some relation between the two is borne out by the onset of relapses when the treatment is stopped, and by improvement when it is resumed; on the other hand, relapses and even death may occur during treatment. In nearly half the reported cases treatment does not exert any influence, and in a few instances alarming symptoms appear to be due to the administration of suprarenal products. That arterial lesions comparable to those produced experimentally may be caused in Addison's disease by adrenal medication is unlikely, though Loeper and Crouzon[2] report a case bearing this interpretation. Adams's[3] critical analysis of 112 collected cases of Addison's disease treated by suprarenal medication shows that in 6, or 5·35 per cent, permanent benefit or cure resulted; in 33, or 29·5 per cent, marked improvement followed; in 49, or 43·75 per cent, no effect was noted; and in 7, or 6·25 per cent, alarming symptoms were due to the treatment.

Tuberculin Treatment.—Although cases thus treated may undoubtedly improve or appear to be almost cured, as in Munro's[4] patient whom I saw, it must be remembered that even small doses of tuberculin may cause alarming symptoms, and probably for this reason the number of reported cases is very small. The prognosis in cases thus treated is complicated by the difficulty of determining that the disease is due to adrenal tuberculosis. Cases of tuberculosis of the adrenals may fail to show any improvement after tuberculin.

Operative Treatment would appear to be entirely contra-indicated [illegible] characteristic of the fully-developed [illegible] been attempted in isolated cases. A tuberculous [illegible] patient [illegible] with [illegible] but without the pigmentation of the [illegible] (Obstrecho).[5] Transplantation of an [illegible] into the testis of a patient with Addison's disease [illegible] Busch and Wright[6] who reported some indeterminate [illegible] was and a half years after the operation

Prognosis in Individual Cases. Addison's disease, when so well [illegible] it can be confidently diagnosed, appears to be almost [illegible] but it is well known that very considerable [illegible] may be entirely latent until, as the [illegible] of tuberculosis falling on the adrenals, [illegible] adequacy occurs and leads to a fatal termination. Sergent[7] [illegible] such cases should not be included in Addison's [illegible] 'acute adrenal inadequacy.' Further [illegible] Addisonism,' especially [illegible] in which the symptoms suggest but [illegible] Addison's disease, may be a temporary condition (Bonnet).[8] The diagnosis in the early stages is difficult, and the possi[illegible] frankly admitted, for cases diagnosed by [illegible] physicians may recover and remain perfectly well. Thus, I know a distinguished physician who was diagnosed as a case of Addison's disease by Greenhow, a well-known authority on the disease, [illegible] years ago, and who was a great athlete and is now a grandfather in perfect health. Out of 293 cases collected by Lawson in 1892 [illegible] was stated to have occurred in ten. It is [illegible] that relief may occur after initial symptoms of [illegible] have been noticed.

The [illegible] of the symptoms in Wilks's cases was eighteen months, but [illegible] cases had a very acute course. On the other hand, survival for ten or even more years after the onset of [illegible] is recorded. The most acute cases are those in which the [illegible] are rapidly destroyed, usually by tuberculous infiltration, but in which symptoms are absent until, as the result of [illegible] the available chromaffin substance [illegible] symptoms burst out in a fulminating manner, [illegible] weeks. As already pointed out, [illegible] examples of Addison's syndrome. Between the very chronic and the fulminating cases there are inter[illegible] cases. Cases of simple [illegible] appear to run a more rapid course than the [illegible] in which the glands are invaded by tuberculosis. Possibly this is because there is atrophy of the whole chromaffin [illegible] tory hypertrophy.

Pigmentation, which usually suggests the diagnosis, is much less [illegible] course of the disease; in [illegible] free from bronzing. In [illegible] a more rapid course than [illegible] last less [illegible] worse [illegible] have [illegible]

[illegible] excessively [illegible] a [illegible] of the radial pulse

[illegible] immediate dissolution. I have twice found the radial p[illegible] in both instances death followed within thirty-six hours [illegible] vomiting and diarrhœa, and [illegible] appendicitis, [illegible] such as influenza or pneumonia, makes the outlook almost [illegible] A high differential count of [illegible] This is probably because it points to the [illegible] of the status lymphaticus [illegible]

[illegible] Gaucher et Gougerot, *Ann. des mal. vén.*, Paris, 1911; [illegible] Crouzon, *Bull. S[illegible] anat.*, Paris, 1903, s. 6, v, 918; [3]Ad[illegible] 1903, lxxi, 472; [4]Munro, *Brit. Med. Jour.*, 1912, i, 665; [5][illegible] *Med.*, Berlin, 1897, xxxi, 123; [6]Busch and Wricht, *A[illegible] Med.*, Chicago, 1910, v, 30; [7]Sergent, E., *Etudes cliniques sur l'A[illegible]* 1898, 14, Paris; [8]Bonnet, *Rev. de med.*, Paris, 1897, xvii, 1[illegible]; [9]*Charité-Ann.*, Berlin, 1892, xvii, 536; [10]Wilks, S., *System of M[illegible]* 1879, v, 359; [11]Castaigne et Simon, *La* [illegible] 1910, xi, 307.

H. D. R[illegible]

ALBUMINURIA. (*See also* NEPHRITIS). The question of prognosis [illegible] albuminuria is present must, in the first place, depend entirely [illegible] diagnosis. Albuminuria may result from contamination [illegible] by an albuminous liquid, such as blood, pus, or spermatic [illegible] Such albuminuria is spoken of as spurious, false, or accidental [illegible], and should be sharply differentiated from true albu[illegible] where the albumin enters the urine from the glomeruli or [illegible] tubules. The differentiation between spurious and true [illegible] does not, as a rule, present any great difficulties, for a [illegible] fluid usually contains a very large number of cell [illegible], which form a sediment on standing, leaving a clear supe[illegible] fluid which contains but a small proportion of albumin. [illegible] microscopic examination of the sediment will aid differentia[illegible] and tissue elements may be present which do not belong to [illegible] urine. The occurrence of true pus cells in large numbers points [illegible] inflammatory affection of the urinary passages; for though [illegible] nuclear leucocytes are found in the sediment of a nephritic [illegible] they are never present in large numbers. When a diffused [illegible] occurs in combination with an inflammatory affection of [illegible] passages, the supernatant urine will contain a large [illegible] of albumin. When false albuminuria is present in associ[illegible] with a chronic interstitial nephritis, the proportion of albumin [illegible] supernatant fluid may be small, and diagnosis may present [illegible] consideration of the total quantity of urine, and the [illegible] the cardiovascular system, together with estimation of [illegible] blood pressure, will always give valuable data for guidance in [illegible]

Physiological Albuminuria.—There can be no doubt that, if the [illegible] be sufficiently sensitive and delicate, albumin can be [illegible] in a large number of normal urines; and it is now [illegible]

[illegible] albumin cannot be demonstrated in every healthy urine, but under physiological conditions or conditions quite within the [illegible] appear in such quantity as to be easily [illegible] tests. This form of albuminuria occurs in [illegible] at intervals, and *only in* [illegible] such as a heavy meal, [illegible] mental excitement, etc. If the urine [illegible] and cylindroids [illegible] casts. The albuminuria [illegible] and the [illegible] at the commence- [illegible] albuminuria, but as training [illegible] it.

Cyclical Albuminuria.—[illegible] from the physiological [illegible] factor is required for its [illegible] be considered physio- [illegible] who are frequently of poor [illegible] defective, atonic digestion. The [illegible] easily deposits urates, and [illegible] a recognized cycle: on rising, [illegible] but it appears during the morning [illegible] in the early afternoon: and it [illegible] The centrifuged deposit may show a few [illegible] epithelial casts. Cardiovascular changes are [illegible] and the blood [illegible] is not above the normal. In [illegible] The patients are somewhat [illegible] digestion requires care and attention, but [illegible] develop nephritis. Under care they may, [illegible] though the albuminuria may persist for [illegible] disappears, and the expectation of life seems [illegible] by the condition.

Febrile Albuminuria.—During an acute infectious disease, it is [illegible] a small quantity of albumin in a urine which, otherwise [illegible] the characters of a nephritic urine. It is possible that, in such cases, circulatory disturbances may come into play; but the [illegible] is cloudy swelling resulting from infection and intoxication. Strictly speaking, such an albuminuria must be [illegible] the first stage of an infectious nephritis, which may or may not develop into a definite nephritis. The presence of the albumin [illegible] has had a marked effect on the organism. The general condition of the patient is often serious: the temperature is [illegible], pulse frequent, and dyspnœa and collapse may supervene. Most of these symptoms are, however, dependent upon the general disease, and not upon the renal disturbance. Prognosis will, therefore, be governed by the general condition. The albuminuria is merely an expression of the profound nature of the general disturbance, which has given rise to cloudy swelling of the tubular epithelium to the [illegible] extent. Febrile albuminuria does not develop

into definite nephritis, but disappears with improvement in the general condition.

Albuminuria of Non-febrile General Disease is found, especially, in advanced conditions involving the blood, such as anæmia, leukæmia, scorbutus, and jaundice. The albuminuria, in such conditions, is apt to be accounted for by the blood condition and the circulatory disturbances which so often accompany the primary disease. It is true that in a certain number of cases, epithelial changes have been found in the kidneys; but these are by no means constant. As a rule, prognosis will be guided by the general condition of the patient. Toxæalbuminuria is an expression of profound disturbance, and will therefore, be a factor to be taken into consideration in guiding prognosis.

Albuminuria occurring in the course of diabetes mellitus seems to stand in a different category. It has been ascribed to the excessive ingestion of eggs; but, in the majority of cases, it is the expression of an insidious nephritis of the interstitial variety, and the patients, for the most part past middle life, show cardiovascular changes. The question of prognosis is a mixed one; for when interstitial nephritis develops in the course of diabetes, amelioration may take place in the diabetic symptoms and glycosuria may disappear. The prognosis then becomes that of chronic interstitial nephritis complicated with hyperglycæmia; that is to say, it is always grave.

Albuminuria due to Circulatory Disturbances is common in cases of cardiac disease with loss of compensation and passive congestion of the kidneys. In these cases, imperfect circulation leads to deficient oxidation and secondary changes in the renal epithelium. An additional causal factor will be found in increased pressure in the renal veins. The quantity of albumin present is usually small, and examination of the centrifuged deposit will exclude nephritis. Prognosis will depend upon the influence of therapeutic measures in improving the circulatory condition; with improved general circulation, kidney function is re-established, and a diuresis follows, with disappearance of the albuminuria.

Proteinuria.—Bence-Jones's proteinuria, in the majority of cases, occurs in instances of multiple myelomata; though it has been found associated with other pathological conditions, such as leukæmia, Hodgkin's, lymphosarcoma, myxœdema, and carcinomatous metastasis. The coagulation of the protein depends upon its relatively easy precipitation below the boiling point, while, on boiling, the solution tends to clear. The prognosis depends, not on the proteinuria, but on the primary disease. As a rule, it is utterly bad; many sufferers only survive the recognition of their complaint a few months. Cases are on record of a much longer duration, however; one, indeed, where the condition persisted twelve years, and the patient appeared to enjoy fair health. Such cases are, however, exceptional; as a general rule, the recognition of proteinuria justifies a very grave prognosis.

1. **The Clinical Features.** [illegible] anxiety [illegible] pre-eclampsia, [illegible] blindness, [illegible] and finally [illegible] confined to the [illegible] upper limbs and [illegible] albuminuria. The [illegible] active treatment should [illegible] the blood-pressure [illegible] and a pressure [illegible] an impending [illegible]

2. **The Urine.** [illegible] of the quantity of albumin, [illegible] by the total quantity [illegible] with the amount [illegible] in a urine [illegible] labour should be [illegible]

3. **The Treatment.** [illegible] the fact that some people [illegible] as following [illegible] the condition becomes [illegible] measures for inter- [illegible] Many cases [illegible] in spite of treatment.

4. **Prognosis as regards the Fœtus.** It is to be remembered that [illegible] the chance of survival, and [illegible] of placental hæmorrhages which are [illegible] the life

[illegible]

[illegible]

ALCOHOLISM.—*See* [illegible]

AMŒBIC OR TROPICAL LIVER ABSCESS.—[illegible] but [illegible] is [illegible] a complication of [illegible] the bowel [illegible] the mortality [illegible] the open operation is [illegible] having been from 40 to 50 per cent. [illegible] in Calcutta. In the [illegible] it is [illegible] but figures based on small numbers of cases [illegible] The mortality varies greatly in different classes [illegible] shown by the following Calcutta figures.

[illegible] post mortem in cases of [illegible] from the medical wards are probably nearly [illegible] it is noticeable that in a very [illegible] seem to clear up, as they contain [illegible] as a rule. They constitute 24 per cent. [illegible] in the Calcutta post-mortem records. Two or more [illegible] also formed 24 per cent., being almost as [illegible] treated by the open operation. Single [illegible] formed 52 per cent. of the fatal cases. When [illegible] treated by the open operation, but are less frequent now [illegible] their mortality having been [illegible] Excluding recoveries, the proportion of large single abscesses [illegible] was 70 per cent., the rest being multiple. In several [illegible] Calcutta cases in [illegible] opened through the chest wall the [illegible] was 75 per cent., in right lobe abscesses opened through the [illegible] wall in the right epigastrium it was 59 per cent., and in [illegible] left lobe abscesses opened in the epigastrium it was [illegible] per cent. A most important direction which must be taken [illegible] in determining the results of any given line of treatment [illegible] spontaneously through the lungs, the mortality [illegible] and operative were generally great. Was 46 per [illegible] now very much less. The rare cases in which the abscess [illegible] into the stomach or bowel do well as a rule without [illegible]

[illegible] to the site of the abscess, the following factors influence [illegible] If the open operation is adopted, especially in bad [illegible] with pneumonia, the larger the abscess cavity the [illegible] prognosis, on account of the extensive discharges following [illegible] inevitable secondary bacterial infection of the cavity. If [illegible] and emetine injections are used, the size of the cavity is of [illegible] at the moment, some liver abscesses containing six pints

[illegible] dealt with in this way. A very high [illegible] 40,000 usually indicates the hopeless multiple [illegible] The continuance of actual dysenteric symptoms [illegible] hepatitis has the same serious [illegible] Great emaciation and an alcoholic history are also [illegible]

Recent improvements in treatment have altogether altered the out[illegible] namely, in enabling [illegible] dysentery as abscess in the [illegible] treated more successfully [illegible] proper treatment in the [illegible] hepatitis. The researches of [illegible] still in the presuppurative stage, can be detected by the blood changes and rapidly cured by ipecacuanha or better still by emetine and the occurrence of the [illegible] together with the [illegible] are nearly all free from [illegible] to adopt repeated aspira[illegible] contrasted with the use of the [illegible] the open operation, a [illegible] tropical liver abscess to be [illegible] figure. The reduc[illegible] following figures. From 1904 [illegible] Army in India averaged 95 yearly, [illegible] the writer's paper was published in 1907 until in 1913 (the last year before the war) they numbered [illegible] former rate. In the European Hospital, Calcutta, the number of deaths yearly averaged 5 during the six years [illegible] since, to reach nil for the [illegible] in 1915.

Leonard R[illegible]

ANÆMIA, APLASTIC. This condition is apparently due to an [illegible] inability to respond to calls [illegible] conditions; in some of [illegible] beginning, so that regeneration [illegible] may first occur and [illegible] sometimes it has followed on pernicious anæmia. We [illegible] prolonged haemorrhage. In [illegible] recovered, and in these [illegible] or weakness of the [illegible] extra demand on its [illegible] anæmia is to be regarded [illegible] The only possible chance [illegible] removable cause. [illegible] As a rule, a fatal termination on [illegible] In one of our cases there [illegible] before admission to [illegible] the red corpuscles numbered 1,300,000 per c.mm.. Death

took place ten days later; the red cells had decreased to 800,000. Another case gave a history of progressive anæmia for two years; his red-cell count was 625,000. Death occurred in seven weeks, the count having fallen to 340,000 per c.mm. Among the signs which indicate that a fatal outcome is imminent are a low red-cell count and a low leucocyte count, especially a diminution of the granular cells.

If nucleated red cells have been present, and either diminish or fail to increase in number as the red-cell count becomes progressively lower, we would suspect that the anæmia was aplastic. In both severe secondary and pernicious anæmia we usually expect to find that the nucleated red cells become more numerous in the blood as the corpuscular count drops. The occurrence of hæmorrhages is an unfavourable indication, and an attack of intercurrent disease renders a fatal issue doubly certain.

G. L. G.
A. G.

ANÆMIA, PERNICIOUS. (*See* PERNICIOUS ANÆMIA.)

ANÆMIA, SECONDARY.—Secondary anæmia may arise from a great variety of causes, and practically the only condition in which the prognosis is not more influenced by the causal factor than by the bloodlessness is post-hæmorrhagic anæmia.

Acute Post-hæmorrhagic Anæmia may be immediately fatal. No other condition causes so much anxiety to the patient. Pallor, giddiness, and faintness may be noticed before much blood has been lost. As soon as the blood-loss has become severe, the pulse becomes low in tension, small in volume, and irregular. All of these symptoms are readily recovered from.

More serious are hiccough, nausea, and vomiting. Persistent syncope is a very grave indication. Fibrillary tremors and delirium are of even more serious omen, and after convulsions have occurred recovery rarely follows.

If the hæmorrhage is checked before a fatal result takes place, the patient is not yet out of danger. The blood is diluted by fluid from the tissues and its respiratory value is thereby diminished; it is also possible that the resulting hydræmia leads to a destruction of some of the less resistant corpuscles.

The maximum severity of the anæmia is therefore not reached till some days after the actual hæmorrhage, but the danger to life is not so great as during the initial loss of fluid. A return of syncope and nervous symptoms at this stage would be a serious indication. It is hardly necessary to discuss immediate prognosis in the case of actual hæmorrhage, since the matter is determined at once. When a serious hæmorrhage has been arrested, it may be of vast importance to be able to estimate the subsequent course of events.

The suddenness of the hæmorrhage is a factor. If blood be lost slowly, or in two or three repeated hæmorrhages, the patient has a better chance of life than if the same, or even a less, quantity of blood were lost rapidly; as, in the former case, there is more time for

Chronic Secondary Anæmia. [illegible]

[illegible]

ANÆMIA, SPLENIC, OF ADULTS. [illegible]

ANÆMIA SEPTICA OF INFANCY. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] **Fowler** [illegible] a high proportion of transitional [illegible] the more simply the leucocyte [illegible] polymorphonuclear leucocytes. The [illegible]

[illegible] will be provided by the [illegible] favourable [illegible] Good hygienic surroundings,

ANÆSTHETICS. [illegible]

Factors other than the Patient. [illegible]

[illegible]

The Patient as a Factor

[illegible] conditions are absent. The [illegible] weight and [illegible] more grave in this [illegible] exhibition) and respiratory [illegible] are marked in [illegible] in the hands [illegible] and overdosage [illegible] Here is a [illegible] The [illegible] degenerates, and those subject to [illegible] in [illegible] hypodermic [illegible]

[illegible]

[illegible]

Anæsthetics. [illegible]

[illegible] absolute [illegible] and the [illegible] obviously [illegible] by the method or [illegible] given by [illegible] and later a [illegible] chloro- [illegible] ingredients of [illegible] exists [illegible] individu- [illegible] Further, these [illegible] vapours [illegible] absolutely [illegible] While [illegible] however, [illegible] more [illegible] The was [illegible] probably true [illegible] observed that when [illegible] generated, [illegible] resuscitation than [illegible] to life [illegible] mention [illegible] amplitude of [illegible] anæsthetics. This is [illegible] is the actual percentage [illegible] at any given moment. [illegible] themselves, by some [illegible] many of these [illegible] or Wertheim's solutions [illegible]

[illegible] nitrous oxide and air or oxygen [illegible] Here the oxygen or air merely supplies

[illegible] oxygenation and so obviates tissue asphyxia, hence per[illegible] substitution of nitrous-oxide gas. The hyperpnœa [illegible] exhaust with the methods employed lessens the carbon [illegible] content of the blood, leading to acapnic conditions: so that [illegible] of carbon dioxide gas to the nitrous-oxide-oxygen mixture [illegible] with some persons, and is employed for prolonged oper[illegible] cases. The simplest method of supplying carbon dioxide is by allowing [illegible] and this is provided for by Teter and others in [illegible] apparatus for prolonged administration of these gases for the [illegible] of major surgery.

[illegible] and Oxygen in Major Surgery.—The prognosis when [illegible] adopted is far less favourable than its sponsors have [illegible] for it. Dr. J. F. Baldwin* has collected statistics [illegible] U.S.A. which demonstrate a very high mortality-rate. [illegible] 1,200 to 4,300 observed cases, this writer states that the mortality [illegible] was 1 per cent. The large number of deaths he [illegible] paper occurred when the anæsthetic was given by men [illegible] expert knowledge and wide experience in its use. The [illegible] have been mainly due to heart failure, and not, as is [illegible], to gradual asphyxia. There seems little doubt that [illegible] collapse which occurred was led up to by the abnormal [illegible] in the pulmonary circulation, which imposed [illegible] which it could not withstand. The method [illegible] prove peculiarly perilous for patients with various [illegible] such as would weaken the resiliency of the organ.

[illegible] combinations as amyl nitrite and chloroform, sommoform [illegible] methyl chloride, and ethyl bromide), and ethyloform [illegible] of the last, need merely to be mentioned as [illegible] anæsthetic agents.

[illegible] Bodies used in Association with General Anæs[illegible] These most commonly in use are atropine, morphine, [illegible] pantopon, strychnine. We may add chlorbutyl, although [illegible] dubious.

[illegible] The use of this drug, gr. $\frac{1}{100}$, given hypodermically [illegible] before administering an anæsthetic, has revolutionized the methods [illegible]. Its action checks the excessive secretion of the buccal [illegible] areas, and so removes one of the great drawbacks of [illegible]. The dose has to be varied according to circumstances. In [illegible] persistent throat dryness follows its use. Children, as [illegible] tolerate atropine well. A further advantage of atropine is that [illegible] the irritability of the pneumogastric nerves (Schäfer), and [illegible] the danger of vagal inhibition of the heart under chloro[illegible]. Heisler's observations appear to prove that much of the [illegible] chest trouble is due to the aspiration into the air[illegible] of saliva and mucus impregnated with the anæsthetic; hence, [illegible] this secretion by atropine diminishes the risk: further

[illegible]

Analgesics. [illegible]

[illegible] It produces [illegible] and [illegible] has been [illegible]

[illegible] have their advocates, but probably neither [illegible] for spinal analgesia. The question of [illegible] is discussed under another caption (see *Ane[illegible]*).

[illegible] is the danger in the use of local and spinal analgesia [illegible] to estimate, as so much depends upon the method [illegible] and the condition of the patient, and these are variants in [illegible]. This fact renders generalization of little practical value. [illegible] however, that these methods, especially the intrathecal [illegible] have inherent sources of danger, since when the [illegible] entered the tissues it is impossible to abrogate its [illegible]. [illegible] errors in technique also matter more in such procedures [illegible] methods. Assuming experience, absolute asepsis, [illegible] regulation of the dose, the danger to life is probably not [illegible] the hands of experts, and the sequelæ are not necessarily [illegible]. It is, however, impossible in the present state of our know[illegible] to promise total immunity from them, or to forecast the degree [illegible] severity.

[illegible]

[illegible] operation performed under local analgesia. Also [illegible] to be more severe when local analgesia has been employed.

[illegible] conditions it is [illegible] to restore spinal analgesia [illegible] adapts for the methods of general anaesthesia [illegible] the ease of obtaining muscular relaxation by the [illegible] method gives the surgeon a better chance of performing [illegible] the success of which the patient's life is involved; [illegible] methods is dangerous in septic [illegible] all and superficial operations; its success [illegible] hospital, unless associated with a [illegible] method mentioned above.

2. **Methods of Employment.** Since the dangers arise from over-[illegible] by some method which embar-[illegible] the nerve centres, or the metabolism, [illegible] from effects of one or other of these [illegible] method selected makes for safety if it gives the administrator [illegible] the dosage of the anæsthetic, or for danger [illegible] imposes upon the patient an in-[illegible] methods of giving chloroform, [illegible] in operations upon persons with feeble [illegible] in cases of gouty or lymphatism, and [illegible] nervous system.

[illegible] conditions contraindicate the employment of ether or [illegible] and anæsthetics provoke venous engorgement [illegible] adoption of 'close' methods. Thus, [illegible] patient with angina Ludovici [illegible] tracheotomy under the circum-[illegible]

[illegible] in operations upon [illegible] abscess cavity opens into a bronchus, since turning [illegible] to the sound side may lead to filling his unaffected lung [illegible]

[illegible] present time regarded as peculiarly [illegible] excessive secretion, [illegible] excessive stimulation which, in its turn [illegible] nerve centres and finally to collapse. The [illegible] is worse than that of chloroform, but it [illegible] that this difference applies only to cases [illegible] has been employed.

[illegible] of great value in prolonged ex-[illegible] of profound blood loss, are liable to [illegible] of saline are allowed to enter the [illegible]

[illegible] in cerebral surgery, as dangerous [illegible] patients they die before the [illegible] the blood may pass into the

[illegible] Such dangers are peculiarly apt to arise in all operations [illegible] mouth, nose, and upper air-passages. In these cases, whether [illegible] infusion of ether or hedonal, or colonic etherization is [illegible] the method used must enable the patient to retain his [illegible] reflex, otherwise foreign material will invade the lungs. [illegible] in favour of the insufflation and pharyngeal methods, that [illegible] doubt is impossible; and were the technique of these plans [illegible] there is no doubt that one or the other would give the [illegible] best chance of avoiding these accidents.

[illegible] of prolonged nitrous-oxide administration, with or [illegible] whether by the nasal route or by one of the many [illegible] provided with a safety valve, is less safe than when [illegible] one brief inhalation. A severe strain is imposed upon [illegible] and the heart and blood-vessels, unless healthy, are [illegible] the blood-pressure becomes raised.

[illegible] insufflation, so far as we know at present, presents [illegible] difficulties; but even slight errors of technique may cause [illegible] interference with the pulmonary circulation, through prolonged [illegible] being maintained in the lungs, although obviously this [illegible] necessity of the method.

[illegible] methods of colonic etherization are valuable, both for operations [illegible] and on the thorax, lungs, and pleura. They prove [illegible] unless the air-ways are kept patent, and also when [illegible] has been weakened by disease, and especially if ulceration [illegible] If liquid ether enters the bowel, serious proctitis will [illegible] excessive injection of the vapour has caused meteorism, [illegible] rupture of the bowel. The ether-in-oil (75 per cent) method [illegible] is yet on its trial; it has been recently shown to be [illegible] danger than was originally supposed. Patients at times [illegible] unconscious for many hours, nor has the method been free [illegible]

[illegible] intermittent adosimetric methods in the use of chloro[illegible] been recognized, but recent work has shown that unless [illegible] anæsthesia is induced, cardiac fibrillation is produced. [illegible] Henderson believes the condition is really due to acapnia; [illegible] theory we adopt to explain the phenomena, there is [illegible] methods which bring about this condition are fraught [illegible] danger to the patient. However, chloroform given by [illegible] system is certainly safer than when an open method is [illegible] The depth of narcosis can be controlled by dosimetry. [illegible] to employ a high as a low percentage value of vapour. [illegible] restrict the strength to values of 2 per cent or less, it is [illegible] exists which proves these values are the safest. In [illegible] may be requisite to employ a vapour of higher [illegible] strength, but the prognosis of any strength above 2 per [illegible] not favourable.

[illegible] the methods of giving ethyl chloride, it may be said [illegible] plan much used by Hornibrook in Melbourne is reputed

[illegible] than [illegible] method. Prolonged use of this anæsthetic presents much the same dangers as does chloroform, unless careful dosage is adopted.

Spinal and Local Analgesia. Broadly speaking, injection above the lumbar region is far more dangerous than at the place of election between the spines of the second and third, or third and fourth, lumbar vertebræ. Experience points to the danger of the method being [illegible] if adrenine is combined with the analgesic, and to the absence of [illegible] from prolongation of the period of insensibility to pain. The relative dangers of heavy or light fluids in the [illegible] have not [illegible] been worked out. It is assumed that [illegible] in the [illegible] in 15 to 20 minutes, and so [illegible] Trendelenburg posture is reputed to be safe, provided [illegible]. The prognosis is, however, less favourable [illegible] in cases of spinal analgesia.

In local or regional analgesia, on the other hand, adrenine together with [illegible] provided the quantity of adrenine [illegible]. That adrenine is a dangerous drug has been shown by Goodman Levy and others, especially when used in conjunction with cocaine in nasal surgery. This is peculiarly the case when chloroform [illegible] and light narcosis is maintained: cardiac fibrillation [illegible] total [illegible].

The Administrator. This factor has been already dealt with [illegible]. It may be added, however, that the [illegible] anæsthesia have become complicated [illegible] intricate apparatus, familiarity with the employment of which needs special and prolonged training. The administrator whose armamentarium is restricted to the older methods may be [illegible] in their use, but his inexperience in present [illegible] of the patient and a bad [illegible]. The character of the operation may demand [illegible] that an unusual method of pro[illegible] adopted. If the inexperienced man under[illegible] mastering the intricacies of [illegible] employ an older and less [illegible] of the surgeon, and [illegible] to improve the prognosis [illegible].

The Physical and Mental State of the Patient.

[illegible] chloroform to persons up to [illegible] is [illegible] of the extra that [illegible] from danger from that [illegible]. At [illegible] children are peculiarly liable to [illegible] and to post-operative [illegible] or cerebrosis).

[illegible] to be carefully weighed. A [illegible] considerable stamina to have [illegible] subject. Indeed, age and

[illegible] the second and more important point must be reckoned less [illegible] than by the healthiness of the tissues, especially of the lungs and blood-vessels.

[illegible] to the question of children, it is beyond the scope of our present purpose to discuss whether lymphatism, status lymphaticus [illegible] a pathological entity; it is proposed to discuss the symptoms and pathological conditions grouped under these headings, [illegible] bearing upon the question of the safety or danger [illegible].

Some *antecedents*—*Lymphatism*. This condition is commonly [illegible] in the light of late years post-mortem examinations have [illegible] lesions not only in infants and children but even in [illegible]. The lymphatic follicles and glands throughout the body [illegible] the heart is commonly small, and the aorta is sometimes [illegible] dilatation. The chronic enlargement of the [illegible] and the presence of post-nasal adenoid growths produce [illegible] ventilation, so that the child suffers from lack of [illegible] of its blood and tissues. There is frequently a [illegible] but it is very doubtful whether this, save in most [illegible] can cause mechanical interference with breathing. [illegible] may be seen sometimes as a shadow in a skiagram, though [illegible] of the shadow does not disprove its presence. Some [illegible] of the thyroid gland is present in about 50 per cent. of [illegible] examined. It is believed by some authorities that the [illegible] with a toxæmia, due to internal secretion of [illegible] glands, which renders the heart peculiarly liable to failure. [illegible] body is increased, the skin is said to be harsh and liable [illegible] and the mental outlook is perverse; thus, although [illegible] is often mentally bright, he is irritable, easily annoyed, and [illegible] self-control on prolonged exertion; hebetude and [illegible] mental attitude. Clinically, the dominating [illegible] is the appalling liability to sudden death from heart failure [illegible] causes. The prick of a hypodermic needle, the [illegible] cold, may claim him as a victim. Into this [illegible] asthmatic, eczematous, and cognate conditions.

[illegible] little doubt that although the incidence of deaths [illegible] this condition is small when compared with the incidence [illegible] Yet even a pronounced case of lymphatism, the [illegible] the catastrophe ensuing upon mental shock, [illegible]. The chief danger appears to arise in the [illegible] cases which show no marked symptoms in life; not [illegible] that every case of a child with enlarged lymphatic [illegible] and gland may not belong to the type, even though [illegible] are all defined. That thousands of such children pass [illegible] of anæsthesia without scathe goes without saying. [illegible] that the use of a local anæsthetic, as a stropacocaine in a [illegible] has been associated with [illegible] of a lymphatic [illegible]. It must be borne in mind that one type of lymphatic patient

[illegible] the [illegible] tory catastrophe. [illegible] German writers [illegible] designated *white death*. [illegible] respiratory origin is known [illegible]

[illegible] the danger from the anaesthetic [illegible] whether one or another drug is [illegible] dyscrasia, all drugs are [illegible] to the fact that such delicate [illegible] concentrations of anaesthetics [illegible] the ordinary individual. [illegible] than that it is the way the [illegible] potent, which courts disaster. [illegible] majority of these deaths. [illegible] the most perilous. It must be [illegible] anaesthetic of choice and the one [illegible] for young persons and for operations upon [illegible] that it is such persons who suffer from lymphatism and usually require this type of operation. It is, however, probable that chloroform is dangerous in status lymphaticus [illegible] blood pressure [illegible] since it is this decline in [illegible] cause death in such cases. [illegible] is administering the anaesthetic, [illegible] and offers the best chance [illegible] success. [illegible] injection of atropine. Death [illegible] lymphaticus has occurred during the use of most of [illegible] anaesthetics, and even when local analgesia has been adopted. Where chloroform is selected, it should be given in the mixture containing one volume of alcohol to nine volumes of chloroform, with [illegible] of air or bottled oxygen, and compel to anaesthesia [illegible] before the operation is commenced. It adds to [illegible] and spasmodic complications, fear, and roughness [illegible]

[illegible] *Delayed Chloroform Poisoning.* Deaths following what appeared to have been a normal anaesthesia, [illegible] by chloroform, by ether, by ethyl chloride, or by a mixture [illegible] delayed effect of the anaesthetic [illegible] and the kidneys, as well as [illegible] The onset of events is marked [illegible] twelfth and forty-second [illegible] is foul and watery, greenish [illegible] There is marked restlessness or [illegible] patient is apathetic, and this [illegible] The stools are scanty and commonly [illegible] exhaustion [illegible] The breath [illegible] The patients are usually young, [illegible] of children [illegible] neither the gravity [illegible] patients whose urine was examined before the

[illegible] thesia and subsequently to the operation, diacetic acid was found [illegible] present before operation, and only a few of these developed [illegible] symptoms. Indeed, it has been demonstrated that mere change [illegible] nutrition (starvation) or improved feeding, is associated [illegible]. The pathology of the condition is certainly obscure. [illegible] a few instances of septic changes in the organs have been [illegible] as cases of 'delayed chloroform poisoning.' Opie, indeed, [illegible] produced fatty changes similar to what is described as 'delayed chloroform poisoning,' by means of bacteria (*B. coli* and *Streptococcus* [illegible]). On the other hand, Leonard Guthrie and others have [illegible] only demonstrated that the lesions—destruction of the glycogenic [illegible] of the liver, degeneration of the parenchymatous tissues of [illegible] organs, and marked fatty degeneration in the organs of the [illegible]entary tract—occur without the incidence of sepsis, syphilis, or other distinctive disease. Association with cyclic vomiting has been [illegible]ted, but although probable, it cannot be considered proved. Most authorities agree that the perversion of the hepatic function leads to failure of metabolism of carbohydrate foods, consequent [illegible] which is destruction of glycogen and some damage to the tissues, [illegible] liberation of fatty acids. The condition is, however, uncommon, [illegible] even those who have had wide hospital experience have seen few [illegible], unless we group all patients who incur prolonged post-operation [illegible] as suffering from the appalling perversion of metabolism witnessed in acidosis. That the anæsthetic is but one factor in [illegible] this toxæmia is obvious, but that it may act in this way is [illegible] certain. Experiments on the lower animals have demonstrated [illegible] repeated inhalation of anæsthetics, and excessive strength of [illegible] vapours, as well as accumulation of the anæsthetic in the tissues, produce destructive tissue effects quite similar to those described above. The association of this toxæmia with diabetes and glycosuria [illegible] more than probable.

[illegible] estimate the prognosis is difficult, since we cannot be sure that [illegible] with normal urine will not subsequently develop acidosis: [illegible] they are weakly, have suffered from cyclic vomiting, are [illegible], and presumably suffer from sepsis, it is certainly grave unless [illegible] can be postponed for a few days and the carbohydrate [illegible] counteracted by rectal injections of dextrose or glucose. [illegible] feeding (glucose ℥j in saline ℥vj), given every three or [illegible] hours, is excellent both before the anæsthesia and as soon as the [illegible]ting appears. It has been suggested that the intravenous infusion [illegible] containing 6 per cent of dextrose offers even a better means [illegible] the requirements of the organism. Whether the com- [illegible]ted method of introducing large quantities of alkalies is [illegible] value is open to question: it does no harm, but at best it is [illegible] a symptom, and not removing the cause of the patho- [illegible] perversion of metabolism. As has been stated above, diacetic [illegible] commonly present in the urine of all patients for its discovery [illegible] operation to veto the employment of an anæsthetic, although

[illegible] that event is otherwise [illegible] careful limitation of the [illegible]

[illegible] is virtually always present [illegible] increases the danger [illegible] chloroform was given. [illegible] died. It must be [illegible] conditions, and so [illegible] symptomatic [illegible] associated with diabetes, [illegible] with inhalation [illegible] but on other anæsthetics [illegible] is, with infancy, [illegible] of physical [illegible] the danger is [illegible] when the heart-beat falls [illegible] and even other, become [illegible] dangerous. [illegible] is unduly [illegible] points perhaps, an hemodyssis [illegible] means, as a result [illegible] Snow's dictum is correct and [illegible] anæsthetic, he is [illegible] points which need [illegible] of the anæsthetic which [illegible] Himself is less, [illegible] and in the condition of the [illegible] to be satisfactory, the [illegible] inhalation. There [illegible] of the super- [illegible] catastrophe.

[illegible] anæsthesia is greater [illegible] is due to repeated [illegible] In the first [illegible] disease, probably a per- [illegible] temporary [illegible] When the surgical aspect of the case [illegible] and especially [illegible] method offers its [illegible] with a [illegible] counteract the [illegible]

[illegible] in these cases is so [illegible] an experience [illegible] discomfort and the use [illegible] But danger is [illegible] sickness is not removed, [illegible] fatal result. Unless the

elaborate method of Crile, 'stealing the thyroid,' is adopted, and [illegible]esia is combined with the employment of both hypnotics (scopolamine, morphine, and atropine) and the nitrous-oxide-oxygen mixture, we have to decide whether chloroform or ether should be employed. Crile's method, unless carried out in its entirety and to the last detail, is not satisfactory; and in this country it is difficult to isolate a patient from her friends, to maintain the mystery as to [illegible] of operation, and ultimately to perform it without a formal consent. A fatal result, which is always possible, would give rise to grave questions of responsibility which needs must be carefully faced beforehand.

The choice of the anæsthetic resolves itself into that of the method. [illegible] a preliminary drowsing with suitable hypnotics is advisable, whether local or general methods are pursued. Local systems are admitted to fail when the thyroid is being dislocated, and this increases the danger. Chloroform with oxygen is only safe when a dosimetric method is employed, as a serious fall of blood-pressure spells disaster. Ether, even if guarded by atropine and given by an open method, often causes dyspnœa in goitre cases, owing to the large excess of bronchial secretion it excites. It has a further disadvantage in that its stimulating effect cloaks the signs of shock, and often leads [illegible] performance of a more extensive operation than the patient [illegible] As soon as the ether effect has passed, profound collapse [illegible] and death is liable to occur. This calamity is especially likely [illegible] when ether has been given in unstinted quantity, as by the [illegible].

Serious Lesions of the Nervous, Pulmonary, Circulatory, Renal, or Metabolic Systems. In estimating the incidence of fatality among [illegible] suffering from the above, we have to consider, less the actual [illegible] than the effects which it has brought about in the physical [illegible] of the patient. If, in the case of disease of the nervous [illegible] recognize that there is, or may be, pressure about the [illegible] Varolii or the medullary centres, we know that any profound [illegible] of the respiratory centre will make for extreme danger. [illegible] is in cases of cerebellar tumour, when much pressure [illegible] bad, while that in cases of cerebral tumour and spinal disease [illegible] nnectomy is serious proportionately so according to the [illegible] the segment of the cord which is subjected to pressure. [illegible]nger is probably less when chloroform is employed than when [illegible]sed. Again, when well-marked arteriosclerosis exists, there [illegible] doubt of the danger of using a general anæsthetic given by [illegible] which involves rise of blood-pressure, since it promotes [illegible] of a cerebral haemorrhage. Three conditions of blood-[illegible]ve an unfavourable prognosis: (1) Unstable conditions [illegible]ulation, such as arise in children, in exophthalmic goitre, [illegible]emias, and also in severe neurasthenia: (2) Excessively low [illegible] pressure, found in prolonged wasting disease, after severe [illegible]ages, and during traumatic shock; (3) Extremely high

blood pressure. In conditions (1) and (2) the prognosis is fairly good if ether can be used, especially in association with oxygen, while [illegible] complications are absent. In (3) the danger to life [illegible] ether or nitrous oxide is used, and when the blood pressure [illegible] to such conditions as interference with respiration. Apnœa has occurred not infrequently as a result of [illegible] poisons in cases of advanced [illegible] disease would it be to employ an [illegible] would increase respiratory difficulty, and so throw [illegible] already taxed to its utmost [illegible]. A mere cardiac valvular lesion, when compensation is [illegible] disease confined to one kidney, need not, [illegible] the patient to greatly enhanced risk under anæsthesia. [illegible] to life when anæsthetics are given to patients [illegible] with cyanosis is considerable, but not [illegible].

Septic conditions. It has been said that the pathological lesions [illegible] liver and other viscera in chloroform toxæmia are closely akin. [illegible] the anæsthetist to employ ether in acute septic [illegible] inhalation, insufflation, intravenous infusion, or [illegible] methods. Probably septic states of the thoracic [illegible] furnish exceptions to this contention. However, as Gordon has shown that phagocytosis is delayed [illegible] anæsthetic is not without its risk, while spinal [illegible] dangerous in marked septicæmia, although safe [illegible] such as 'acute appendicitis.' If ether is employed, [illegible] of 5 oz. of pure olive oil per rectum, as soon as the patient is carried back to bed, has been shown to assist the rapid return of the power of phagocytosis.

5. The Nature and Duration of the Operation and Intercurrent Conditions associated therewith.

Shock. *Blood pressure. Body Temperature.* It is impossible in this place to [illegible] lengthy discussion of surgical shock. From [illegible] we know that trauma in certain regions, [illegible] certain structures, appears to bring about conditions [illegible] commonly grouped under the term 'shock,' often associated with [illegible] procedures which in themselves do not seem serious [illegible] 'insult to tissue.' Such operations are those which involve the opening of the large somatic or cranial cavities, laparotomies, orchidectomies, opening of the thorax, exploratory [illegible] of the brain and spinal cord. Further, when viscera, and [illegible] certain serous membranes, are dragged upon and dislocated [illegible]. In the case of serous membranes, Professor Yandell Henderson contends that the loss of carbon dioxide produces a [illegible] cause of heart failure. Undoubtedly the opening of such cavities leads to changes in the hæmodynamics [illegible] prejudice the carrying on of the normal circulation. This is indicated, for example, by the rapid

recovery of the patient when the abdominal walls are closed. We know that shock may be regarded as loss of body heat and fall of blood-pressure, and hence it becomes necessary that the anæsthetic, and method of using it, should be so safeguarded as to prevent an additional diminution of either blood-pressure or body temperature. Since elimination of the anæsthetic, if from the lungs and kidneys, predicates abstraction of heat, it follows that the less anæsthetic there is employed the less will be the drain on the body heat.

A fall of blood-pressure is usually dangerous, but if the initial blood-pressure is high or if it is desired to prevent any congestement of the vessels, as in cranial and spinal surgery, chloroform is adopted to facilitate the surgeon's work by lowering the blood-pressure. The administration of oxygen removes the danger of the lessened activity of the respiratory centre. Hæmorrhage antecedent to, or involved in, an operation is best met by introducing saline *pari passu* with the anæsthetic: hence we adopt ether infusion, colonic etherization with tissue infusion, or some kindred method.

Prolonged operations are often necessary, and may prevent the use of spinal methods; and their dangers as regards anæsthetics are either excessive fall of blood-pressure leading to profound collapse, or undue stimulation followed by even greater collapse after the anæsthetic has ceased to be used; while an after-danger exists owing to the cooling and shock engendered by the elimination of the large amount of the anæsthetic which has entered and become segregated in the tissues. The first danger is that of chloroform, the second is that of ether. The two conditions being compared, we find that the chloroform collapse is more rapidly and more readily surmounted than is its counterpart due to ether. In prolonged anæsthesia, such dangers can be avoided by careful moderation of the dosage. As time goes on, especially if traumatic shock and hæmorrhage occur, extraordinarily little anæsthetic is needed, and this minimum should never be exceeded.

The 'mixed method' of using scopolamine-morphine and atropine before the general anæsthetic, is most valuable in such cases, as it allows the anæsthetist not only to lessen the dose required for induction, but practically to maintain anæsthesia without inhalation. If this is overlooked, and the anæsthetist employs a large quantity of the anæsthetic, the patient is subject to grave risks. Overdosage causes extreme shock at the time of the operation, and collapse after its completion.

Severe or Persistent Vomiting.—It is often necessary to subject a patient to an operation to relieve a condition which itself causes or has caused severe and persistent vomiting. Further, it is often necessary to perform an operation upon viscera interference with which commonly brings about serious after-sickness. Vomiting, at times troublesome, may actually determine death through exhaustion, since sleep and immobilization are necessary in order that traumatized tissues may heal. Therefore, in selecting the anæsthetic

[illegible] the consideration the likelihood of after-treatment, and [illegible] to minimize the dangers arising thereof. [illegible] in their hands by to vomiting.

The [illegible] may be sought, grouped as follows:—

Cirrhosis. [illegible] of the cardiac mucous membrane. [illegible] nausea and saliva [illegible] Children, [illegible] women, "bad [illegible]. [illegible] prone to this trouble. [illegible] the prognosis is favorable [illegible]

Hiccough. [illegible] from mechanical conditions, which [illegible] in the brain and can be obviated by [illegible] Unless there is obvious [illegible] a half sitting posture [illegible] especially liable to occur [illegible] not in our experience [illegible]

Vomiting [illegible]. Operations, with or without general [illegible] hiccough, or otherwise, are peculiarly [illegible] especially in this [illegible] in regard [illegible]

[illegible] the [illegible] of Excess in many [illegible] blood and poison [illegible] Vomiting [illegible] the subjects of Toxemia, the [illegible] vomiting as two factors are [illegible] vomiting and diagnosis [illegible] the quantity of the anæsthetic given. [illegible] nausea, sickness and general [illegible] the present writer, brought out [illegible] Weakness and [illegible] vomiting of the [illegible] were developed. [illegible] in the case of chronic [illegible] and dilated feeble heart [illegible] such as eclampsia, [illegible] through exhaustion of the [illegible] following excessive stimulation [illegible] unnecessarily large quantities [illegible] The prognosis is [illegible] Cobbledstone, since very large [illegible] the operation and it is only [illegible] is observed.

[illegible] vomiting after general [illegible] "mumbo-jumbo" [illegible] the amount of the anæsthetic, and [illegible] by opium, atropine, or chlorbutyl, before the [illegible] of the head—lateral [illegible] posture later will prevent [illegible] sickness. The [illegible] cases arise from the stomach.

[illegible] at [illegible]tment, and from absence of sleep. Here rectal or [illegible]dar injections of saline and dextrose, and the use of [illegible] on suitable cases, will be efficacious. Morphine, however [illegible] after chloroform will sometimes cause sickness, and in [illegible] way. The patient recovers from the anæsthetic, without [illegible] sickness, and seems extremely well for twelve or twenty [illegible]rs, when severe vomiting comes on and is at times very [illegible].

[illegible] after spinal analgesia is not infrequently severe and [illegible], especially if much encephalalgia exists. Although it is [illegible] in a few cases, the condition is transitory and [illegible] to treatment.

[illegible] *Vomiting.*—A much more dangerous condition may [illegible] of intestinal obstruction. The contents of the stomach [illegible] are regurgitated, rather than vomited by muscular [illegible] usually the flow commences as soon as the muscular tonus [illegible] and pyloric orifices becomes lessened by the anæsthetic, [illegible] both when general anæsthesia and spinal analgesia are [illegible]. Unless it is possible to prevent aspiration of the material [illegible] passages, the prognosis is most unfavourable. Even [illegible] is not a complete safeguard, although it should be used [illegible]ticable. As the back-pressure remains constant, when the [illegible] is emptied the intestinal contents still flow into it, so that [illegible] method is to maintain a constant irrigation of the stomach, [illegible] the shoulders and head of the patient kept high during the [illegible]. The laryngeal reflex should be kept active. In very serious [illegible]bation of the larynx with forced respiration, as obtains in [illegible] insufflation, or the method of a preliminary tracheotomy [illegible] by the present writer,[1] may be employed.

Post-operative Effects. It is unnecessary to dwell upon the [illegible] and usually slight, after-effects of anæsthesia or anal[illegible]. The more serious ones, i.e., those threatening life, which [illegible] forty-eight hours or so after the operation, are respir[illegible], nervous, metabolic, and renal. These have all [illegible] with in the preceding sections, but may be summarized [illegible].

[illegible] previously affected by bronchitis, inhalation of unwarmed [illegible] or chloroform may determine a recrudescence of the [illegible]. It is most common with the former, partly because the [illegible] irritating, and partly because it lowers the body [illegible] from 0·5° to 3° F. during a prolonged inhalation. Bron[illegible] chloroform is, as a rule, more severe, and associated [illegible] tissue destruction. Prolonged administration of nitrous [illegible] oxygen in major surgery, unless the gases are warmed, [illegible] bronchial trouble, but it is an infrequent complication. [illegible] that when much bronchorrhœa is caused, the [illegible], and bronchial secretions are aspirated and enter the [illegible] setting up irritation. Tight bandaging, by impeding

[illegible] being expelled, and a pneumonia [illegible] are usually present [illegible] Dr. Wilson. Practical experience [illegible] many cases of [illegible] pneumonia [illegible] of [illegible] pulmonary [illegible] Pneumonia of a [illegible] bodily predisposition [illegible] when operations upon [illegible] have been performed, and is [illegible] growth, pus or contaminated [illegible] will usually reveal themselves [illegible] In this connection, the observations of Magnus [illegible] in 1898 may be recalled. He [illegible] post-operative pneumonia after the [illegible] in [illegible] by chloroform. [illegible] that the incidence of pneumonia was [illegible] Miculicz then replaced chloroform [illegible] he found that post-[illegible] frequent still. Thus, out of 114 [illegible] 25 patients had lung complications. It follows [illegible] is more favourable when other [illegible] [illegible] to anæsthetics are in [illegible] through the lymph [illegible] probable.

Preparation. Before the operation, the teeth, mouth and nasal [illegible] cleansed and unhealthy gums painted [illegible] If the breath is foul and the stomach [illegible] of the alimentary tract [illegible] may be pursued. Atropine, given hypodermically [illegible] prevent bronchorrhœa and salivation. The [illegible] should be warmed and moistened, and given so [illegible] subsequently to full anæsthesia [illegible] been obtained by the induction. [illegible] body temperature must be main-[illegible] from draughts as he is conveyed [illegible]

If [illegible] the lungs may follow the exhibi-[illegible] the kidneys are diseased and albuminuria [illegible] with acute œdema of the tongue and [illegible] If an undue quantity of saline is intro-[illegible] pulmonary œdema is a serious [illegible] of the amount must be practised, [illegible] exists.

[illegible] œdema are in serious danger [illegible] chloroform while tracheotomy was [illegible] and ether are contra-indicated for [illegible]

All anæsthetics, when inhaled in great quantity, especially if the [illegible] of the blood is not kept at about its normal during

[illegible] which may cause bronchial cooling, catarrh, irritation, and [illegible] after the operation. The law is certainly true that the [illegible] "an and there are in severity and frequency a function [illegible] and tissues. If the vapour as it enters is warmed, some of [illegible] effects are removed.

[illegible] headache, backache, vomiting, oculomotor paralysis, [illegible] of the bladder and rectum, may follow spinal anæsthesia [illegible] know for certain whether these arise through irritation of [illegible] or through alteration in the amount of the cerebrospinal [illegible] Their occurrence is rare, but at times these sequelæ are alarming. Some surgeons regard them as evidence of errors of technique, but even so it is not possible to avoid them entirely, nor should we minimize their gravity when they arise. The possibility of acute mania or delusional mania consecutive to operations undertaken under local analgesia must be remembered. Such cases are rare, and the ultimate prognosis is favourable, though the condition causes great distress to the patient's friends.

[illegible] Buxton, "Fæcal Vomiting during Anæsthesia, a Suggested Method of Obviating its Danger," *Brit. Med. Jour.* 1910, April 23.

Dudley W. Buxton.

ANEURYSM, ABDOMINAL. It is needful to remember that aneurysm of the abdominal aorta and its branches is an obscure disease, hard to detect in early stages; so that when the physician meets with a case in which there is no doubt as to the presence of an abdominal aneurysm, the sac is already large. Unhappily, the newer method of diagnosis by skiagraphy does not give as much help in the discovery of aneurysms below the diaphragm as it does in those situated within the chest. The stealthiness of the early stages of the disease is prejudicial to the patient's chance of recovery; a sac that can be felt is not likely to be 'cured.'

General Outlook.—I do not know of any proved example of complete [illegible] final cure of an abdominal aneurysm large enough to be diagnosed as such. Of course there are examples of what appeared to be a [illegible] swelling connected with the abdominal aorta failing to kill the patient; but these are usually cases of atheroma, and not of real aneurysm. Again, it is not an unusual experience to encounter healed [illegible] aneurysms in the course of a post-mortem examination; [illegible] these are small, as a rule, falling far short of the size which must be attained if the sac is to be detected clinically. Moreover, abdominal aneurysms are not seldom multiple; in the patient who dies from [illegible] of one sac, another may be found completely obliterated by [illegible] of clot. True 'cure' of abdominal aneurysm diagnosed [illegible] life is therefore almost, if not quite, unknown.

In spite of this, patients may live for a considerable time after the onset of symptoms: in one of Nunneley's series, collected from the St. George's Hospital records, the duration of the case extended over [illegible] years, while one of the Guy's Hospital patients, whose cases were tabulated by J. H. Bryant, lasted twelve years. These are,

[illegible] exceptions to the general rule; and the average expectation of life from the onset of symptoms, judging from the 86 cases included in these two series, is not more than fifteen months. The shortness of the period, as compared with that of thoracic aneurysm, is no doubt largely due to the greater difficulty of diagnosis; it cannot be [illegible] danger in the abdominal variety, for there is not the same risk of injury to vital structures that there is in aneurysm within the chest. Aneurysm of the abdominal aorta is usually limited to the retroperitoneal tissues, and it is into these tissues, in the great majority of instances, that the fatal rupture which terminates most cases occurs. The course of abdominal aneurysm is slow, because its earlier stages are not productive of symptoms.

Sudden Death.—In almost two-thirds of Nunneley's cases, in all of which the diagnosis was verified by post-mortem examination, the [illegible] In many of these it was due to rupture, usually into the retroperitoneal tissues, rarely into the peritoneal cavity. It is this predisposition to rupture that makes an abrupt [illegible] rather more frequent here than in aneurysm of the thoracic [illegible] as it may seem when we reflect upon the [illegible] opportunities presented to the thoracic aneurysm of rupture [illegible] adjacent hollow viscera, it is the abdominal aneurysm, limited [illegible] to the parietal peritoneum lying in front of it, that bursts the [illegible] In many instances the end is dramatically sudden, no [illegible] of its approach being given until the patient drops dead. In other [illegible] period of collapse sets in abruptly, with or without pain, [illegible] before death. It is therefore essential to remember that when a patient with abdominal aneurysm faints away, it is likely [illegible] will be few, particularly if severe pain accompany the onset of the faint. It is the more necessary to bear in mind this [illegible] hemorrhage, because it is so rare to find bleeding [illegible] aneurysm declaring itself in the form of haemat- [illegible] or other external haemorrhage.

Features of Prognostic Significance.—Everything that predisposes [illegible] on the part of the patient is prejudicial to recovery or [illegible] This factor counts for less, however, than in [illegible] because the pain of abdominal aneurysm [illegible] to reduce nearly every one of its victims to a state of [illegible] For this reason, neither the age nor the occu- [illegible] much bearing on his expectation [illegible] from the records of cases. Sex, again, is of [illegible] least it is difficult to assess any importance [illegible] abdominal aneurysm is a rare disease in [illegible]

[illegible] of rupture as have already been mentioned [illegible] cannot from the nature of the symptoms and [illegible] accurate prognosis. It is true that [illegible] has achieved satisfactory results; but the number of these is so small that it is impossible to [illegible]

as to the features which promise success along these lines further than to say that extirpation is only possible when it is a branch of the aorta, and not the aorta itself, that is implicated. Such aneurysms, e.g., of the renal or hepatic arteries, are diagnosed with the greatest difficulty, and are oftenest found by accident or through exploratory laparotomy, so that there are no indications to enable the clinician to forecast a successful result.

Influence of Treatment on Prognosis. The question that we should like to be able to answer is, Does any more radical method of treatment yield better results than the usual plan of rest in bed, with restricted diet, and drugs?

Proximal ligature of the abdominal aorta has been practised, both for aneurysm of the aorta and of its branches, in each case with immediately fatal results. The hepatic artery has once been successfully tied on the proximal side of an aneurysmal sac; but this aneurysm is extremely rare and seldom diagnosed. Moreover, in three other cases this operation was fatal. Aneurysm of the iliac artery within the abdomen and pelvis has been attacked by proximal ligature in 33 instances where the results have been recorded; recovery ensued in 9, the operation killing the remainder.

Extirpation is clearly impossible in nearly every kind of intra-abdominal aneurysm. It has, however, been successfully carried out in the treatment of aneurysm of the renal artery, the kidney being excised together with the sac.

Acupuncture, the method introduced by Macewen, cannot, as a rule, be safely undertaken except after incision of the belly wall. It is true that in Macewen's case this precaution was not taken, and the result was nevertheless satisfactory, the patient being alive and at work two and a half years later; in other cases, however, death has followed immediately after needling.

Introduction of wire into the sac, Moore's method, has been practised [illegible] times for abdominal aneurysm, death following more or less immediately in all but 2 instances. Corriadi's modification consists in the passage of a *galvanic current* through the wire introduced into the sac. This procedure has been put to the test in thirteen instances of abdominal aneurysm. The best result was in one of Finney's cases, the patient dying, three and a half years after operation, from rupture of the sac. In one other case the patient did well, dying eight months later of dysentery. The fate of a third patient is unknown, but cure was improbable. In the other cases, death followed within [illegible] days.

It appears, therefore, that all surgical methods hitherto devised introduce an unjustifiable risk without offering any certain advantages to counterbalance it. One or two other plans of a somewhat less dangerous nature have to be considered.

Prolonged proximal compression through the abdominal wall, the method introduced by Murray, of Newcastle, and successfully applied in [illegible] patient who was alive six years later, has its limitations.

and also involves certain risks. In the first place, there are but few cases of abdominal aneurysm in which the aorta can be compressed on the proximal side of the sac, which generally lies too near to the costal border to leave room for compression. In the second place, the pressure which is necessary [illegible] is such that it introduces a risk of injury to the bowel and other abdominal viscera, and fatal results have already been produced in this way. A preliminary laparotomy might remove this risk, but it introduces fresh disadvantages, so that this method cannot be said to promise better results for most patients with abdominal aneurysm.

Gelatin injection. There is, lastly, this method of Lancereaux. Though good results have followed in a few instances, no improvement has been recorded in the majority of published cases. There is some risk of tetanus following the injection, though this has been circumvented by more careful sterilization of the gelatin. It is to be feared that this method does not improve the patient's prospect of cure.

It seems, therefore, that we must be content, for the present at any rate, with the ordinary medical treatment along the lines introduced by Tufnell: absolute rest, reduction of diet and particularly of fluids, and administration of potassium iodide in full doses. This does not promise any great likelihood of cure, but it is at least free from risk; and since the patient is already invalided by pain, it does not impose any great restriction upon the activities which he would otherwise be free to pursue.

Carey F. Coombs.

ANEURYSM, INTRATHORACIC. Aneurysm, and fusiform diffuse dilatation of the aorta, must be considered apart, since the factors influencing prognosis are totally different in the two affections. This article, therefore, is devoted to a summary of the prognostic factors of sacculated aneurysm within the thorax.

The outlook in a patient afflicted with this disease depends on the balancing of two factors: the rate of growth of the aneurysm, and the rate of coagulation within the sac. Increase in the size of any aneurysm threatens to end the patient's life by haemorrhage; to this, in the case of aneurysm within the chest, are added the various disabilities and dangers involved in pressure on vital or sensitive organs and tissues.

General Outlook. Does *complete recovery* ever occur? In quite a number of autopsies "healed" aneurysms of the thoracic aorta and its branches have been found, but these were not detected during life. A few cases have been recorded in which an aneurysm, unmistakably present and even projecting through the thoracic wall, has become solid and remained so for periods of over ten years. The longest duration of which I can find any record was in a case quoted by Osler, in which the patient lived over twenty years after the condition was first diagnosed. So favourable a result as this is, however, highly improbable, even in these days of early diagnosis by radiography.

As to the *average duration of life* from the onset of symptoms, de Havilland Hall's recently published figures are of value, since they

[illegible] to patients whose position in life enabled them to take every [illegible] caution. In 27 cases carefully followed up, the average duration of [illegible] amounted to about three years. It is more than probable that [illegible] period, brief as it is, is too long, if patients be included who are [illegible]ged to work.

In estimating the expectation of life that can be held out to any [illegible]en patient, therefore, it is fair to take this as a basis: that though he may live for ten or fifteen years from the moment of discovery, it [illegible] not likely that he will last for more than three years.

Sudden Death.—Thoracic aneurysm is one of the notorious causes [illegible] sudden death. To the dangers never absent from a heart whose [illegible]nary arteries are diseased—as they are in a majority of cases of [illegible]urysm,—are added those of rupture, with rapidly fatal hæmorrhage; [illegible]d, in a few instances, those of aortic insufficiency.

In de Havilland Hall's experience in private practice, about one-[illegible]rd of his patients died suddenly.

This sudden termination may be due to cardiac failure or to rupture. The omens pointing to the former possibility are not different from [illegible] of chronic cardiac disease generally: paroxysmal cardiac pain, dyspnœa on exertion, the alternating pulse, and physical signs of aortic regurgitation, all enhance the risk of an abrupt failure of the contractile power of the heart. In de Havilland Hall's Westminster Hospital statistics, over 40 per cent of the deaths were due to car[illegible] failure. Aneurysms pointing externally rarely burst suddenly: [illegible]deed, leakage of blood into the subcutaneous tissues may continue for quite a long while in such cases without foreshadowing rupture, and the patient may die eventually of exhaustion or some such cause. Aneurysms of the intrapericardial aorta are particularly liable to burst into the pericardial sac; this is immediately fatal, but in most cases the diagnosis has not been made. Fatal hæmorrhage occurs more frequently in patients who present evidences of pressure on the trachea, bronchi, or œsophagus, than in those who do not show these signs. The rupture may also pour its blood into the mediastinal tissues: this also is more likely to happen if the sac arise from the transverse or descending part of the arch. Curiously enough, patients in whom the aneurysm bursts into a great vessel—superior vena cava or pulmonary artery—often survive the immediate shock of the catastrophe and live for weeks or months. A common direction of rupture is into the left pleural sac; this is particularly apt to occur in aneurysm of the descending aorta, and kills quickly.

Features of Prognostic Significance.—The *age* of the patient has little bearing on the outlook: the older the patient the better the prognosis. "Healed aneurysm is rarely seen in a man under forty" (Osler). This is partly due to the quieter life of elderly men, partly, perhaps, to the fact that the younger the man in whom an aneurysm has appeared, the more likely is it to be due to active syphilis of the aorta. And the more active the syphilitic process, the sooner will the aneurysm burst.

The sex is of some importance: women carry aneurysms without much inconvenience longer than men, presumably because they are subjected to less physical strain.

The *occupation and social position* of the patient is a consideration which influences the prognosis along the same lines: the man who can take things quietly, and rest as much and as long as he needs, stands a far better chance than the man who must work or starve. Of course, there are extraordinary exceptions: men with large aneurysms have been known to work at laborious occupations for years, but the great majority [illegible].

Most [illegible] aneurysms [illegible] origin, and result directly from spirochaetal infection of the aortic wall. Unhappily, it is not always possible to detect this morbid process in the presaneurysmal [illegible] once the aneurysmal sac has reached such dimensions that it produces symptoms, the aortic wall is injured beyond repair; yet *early diagnosis*, such as is now possible by means of radiography, does [illegible] improve the patient's chance. This comes about in two [illegible] mercurial treatment, if instituted as soon as the diagnosis is made, prevents extension of the aortic disease; and the patient also comes under restraining influences in time to obviate, or at any rate to postpone, disaster.

The *site of the aneurysm* has a most important bearing on the patient's hope of survival. Something has already been said about this in considering the risks of sudden death. Broadly speaking, it is the aneurysm that springs from the ascending extrapericardial portion of the aorta that lasts longest; its tendency is to extend to the right into the lung, or forward by erosion of the chest wall, and in spreading in either of these directions it encounters structures of relatively little resistance; the pain that is caused by injury of intercostal nerves wears the patient's strength down; but when the aneurysm bulges forward as a definite tumour consisting mainly of solidly packed clot, it is [illegible] how long life may last. Even when the swelling has attained a very large size, the patient may carry it for months, or even years. The writer recollects one such case, in which the aneurysmal sac presented over the greater part of the right front, below the [illegible] rib, such as the inferior angle of the right scapula; and yet the patient survived in hospital for several months and died eventually of exhaustion, though the sac had leaked through the [illegible] of the chest wall for weeks. One of the worst things that can happen to an aneurysm arising from this part of the arch is rupture into the superior vena cava; this often leads to death in a few days, [illegible] patient survived for several months after the rupture occurred. Rupture into the pulmonary artery is less immediately fatal, especially when the communication is established gradually, as it is in some cases.

The most quickly fatal form of aortic aneurysm is that which arises from the intraperitoneal portion; this type shares with coronary aneurysm a peculiar predilection for rupture into the pericardial sac.

a calamity which is fatal at once, or in a very short time. Possibly earlier diagnosis might help to avert this; but even with the *x* rays it is not easy to be sure of the presence of this type of aneurysm, and while it is still comparatively small, the fatal rupture is apt to occur.

Aneurysms springing from the transverse aorta are especially dangerous on account of their proximity to vital organs, and to hollow viscera into which rupture may occur. Approximately one-third burst, especially into the trachea, left bronchus, or œsophagus, or into the left pleural sac. The danger of rupture may be apprehended, therefore, when the physical signs point to the existence of pressure in these directions; and particularly if the sac appears to be dribbling into one or other of the hollow tubes. Apart from the danger of rupture, there is that of interference with important functions: asphyxia from pressure on the trachea may end the patient's life; the œsophagus may be compressed and swallowing hindered; or more probable still pressure on the left bronchus may lead to retention of secretions, with bronchopneumonia or some other form of pulmonary infection. Any evidence pointing to such occurrences is of the gravest import, for pulmonary infections of this type do not take long to kill.

Aneurysms of the descending portion of the arch and the descending intrathoracic aorta are very apt to rupture, especially into the left pleural cavity: in Dr. Oswald Browne's statistics, collected from St. Bartholomew's Hospital, this was the end of more than one-third of the cases of descending thoracic aneurysm. Next after this comes rupture into the œsophagus or left bronchus. The sac that bursts in these directions is often quite small; the writer recollects making an autopsy in a case of fatal hæmorrhage into the œsophagus from an aneurysm no larger than a walnut. When the difficulties of diagnosis, and therefore the improbability of early treatment, are taken into account, it is easy to see why the prognosis is so gloomy in cases of descending thoracic aneurysm.

Dissecting thoracic aneurysm, curiously enough, often spares its victim for years after the etiological rupture has taken place. A case of survival for thirty years is on record, and there are others nearly as long.

Aneurysms arising from the great vessels, in the intrathoracic portion of their course, have yet to be considered. It might appear that the prognosis would be more favourable in such cases, since they seem to offer a possibility of surgical attack. As a matter of experience, however, the outlook is no better than in the case of aortic aneurysm. The sac so often arises close to, if not actually at, the point where the vessel leaves the aorta, and the aorta itself is so frequently the seat of advanced syphilitic disease, and even of a second aneurysm, that little more chance of successful treatment is offered than in the case of aortic aneurysm.

Lastly, there are one or two general considerations.

Multiplicity of Aneurysms. The possibility of this must never be forgotten. Occasionally, the sac which is obvious may be undergoing solidification, while another undetected aneurysm, or a new pouch of the primary sac, may be spreading in a different direction. Before a favourable prognosis can be given, therefore, every effort must be made to exclude the presence of a second sac.

Situation of Hæmorrhage. Speaking broadly, hæmorrhage to the surface, whether direct or through a hollow viscus, is less deadly than internal bleeding: it may stop itself by the fall in blood-pressure which it induces; whereas, in hæmorrhage into a closed space, there is not only loss of blood, but also disturbance of internal pressure, to be considered. Rupture into the pericardial sac, for example, is fatal, not because it deprives the patient of blood, but because it embarrasses the heart.

Evidence of Solidification. The most favourable omens in any case of thoracic aneurysm are those which point to solidification by deposition of fibrin; they are limitation of pulsation, hardening and shrinkage of the sac, and increase in the density of the *x*-ray shadow. Unhappily, it is not possible to study these processes satisfactorily in many cases; only those which are pointing through the thoracic wall can be palpated; but when, in such cases, the tumour is becoming harder and throbs less, the outlook is relatively favourable. Even so, the possibility of spread in another direction must be kept in mind.

Influence of Treatment on Prognosis. Is it possible to say that the outlook is improved by the adoption of any particular line of treatment? The results achieved by the various plans of treatment in use must be compared in order to answer this question.

First, there is what may be called the *ambulatory plan*. The patient is restrained from severe exertion, but he is allowed to walk about and do his business, provided it does not entail heavy labour; drugs, usually potassium iodide in full doses, being given meanwhile. Remarkably good results are achieved in some cases, particularly when the patient is a reasonable being, and able to regulate his life wisely; but over against these successes must be set a large number of failures, including a considerable percentage of sudden deaths from rupture. It is impossible to form a definitely calculated estimate of the expectation of life to be offered to the patient who chooses this plan, or is obliged to be content with it; but the writer, judging from out-patient experience, would, on an average, place it at something within two years.

Second, the *Tufnell plan* must be considered. This term includes absolute and prolonged rest, with restriction of diet, especially in the matter of fluids; convalescence is jealously guarded, and there is no actual return to heavy bodily work. Here again it is very difficult to supply figures, for a large number of patients undergo treatment which is a compromise between, or combination of, this plan and the preceding one. De Havilland Hall's figures, relating to 27 cases, show that the average expectation of life in patients who have followed the

Lefnell plan for as long as they could endure it, and have subsequently ordered their lives as peaceably as they might, is about three years from the onset of symptoms. Remarkable successes are sometimes achieved by this plan, provided the period of absolute rest be repeated from time to time as symptoms dictate; and from a survey of the available facts, the writer is inclined to claim that a higher percentage of survivals over five years is to be found among patients undergoing this than among those following any other method.

Third, the *gelatin treatment*, introduced by Lancereaux, was rather discounted at first by the fact that it was followed by tetanus in a few cases. This, however, can be avoided; and the method has been fairly tried. Kingston Fowler's results, in 12 cases treated along these lines at the Middlesex Hospital, did not, in his opinion, show any superiority over those attained by other methods.

Lastly, *surgical methods* remain to be considered. Attempts at extirpation of an intrathoracic sac arising from the aorta have, without exception, been immediately fatal. According to Monod and Vanverts, who examined records of 77 recent cases of innominate aneurysm treated by distal ligature of the common carotid with the subclavian or axillary artery, temporary improvement followed in 57 per cent, immediate death in 14 per cent, and the remainder were classed as failures.

Of late years American clinicians have given a thorough trial to wiring methods, i.e., treatment by the introduction of wire into the sac of the intrathoracic aneurysm, with or without the passage of a galvanic current through the wire. Even when due allowance is made for the desperate nature of the cases to which such a plan is likely to be restricted, the results cannot be regarded as encouraging. In Eshner's table of 38 cases, death followed, in exactly half, within a month of the operation; but 1 patient survived for twelve years. Of Hall's 22 cases, 1 lived for five years; and of Finney's 23 cases, 1 lived for three years. Regarded from the prognostic view, therefore, it does not seem that longer life can be promised to the patient who submits to this operation.

To sum up, the truth is that the outlook in any case of thoracic aneurysm is bad; the average expectation of life is not more than three years, and even this brief period is not likely to be attained if the sac be projecting backwards from the transverse or descending aorta. Life is more likely to be prolonged if the patient is able to submit himself to the ordeal of complete rest with restriction of diet, and if the diagnosis be made early. *Carey F. Coombs.*

ANEURYSM OF PERIPHERAL ARTERIES.—Although spontaneous cure of a peripheral aneurysm has been known to occur, it must be very rare. In these days of surgery it is almost invariably the practice to operate instead of waiting to see what nature might do; but in the pre-antiseptic era various methods of natural cure, by extension of clot from the sac, 'plastic arteritis,' pressure of the sac

[illegible] were described, and in a few cases an aneurysm has been known to disappear *en masse*.

Popliteal aneurysms are not always progressive, but may last for years without appearing to do any harm. In the end, however, the recorded cases all required treatment for severe symptoms. The author has seen a popliteal aneurysm in a woman who had had it for [illegible] and caused little or no inconvenience, and was therefore [illegible] it operated on. They are more rapidly progressive in [illegible] and vigorous than in feeble old persons with a reduced circulation.

The life of a patient with an aneurysm is, however, always in jeopardy. Sooner or later it is liable to rupture into the subcutaneous [illegible] rapid death from loss of blood, or such [illegible] of the cellular planes as may lead to the necessity [illegible]. Occasionally suppuration may take place. The [illegible] the disease is emphasized by the fact that even in the [illegible] surgical art, before anæsthetics or antiseptics had robbed [illegible] of its terrors, almost nothing but the direst necessity led the surgeon to abandon the expectant method and perform a major operation. There were a number of well-established methods for the operative treatment of aneurysm. Apparently the condition used to be comparatively [illegible]. We must allow due weight to the experience of those early surgeons that the policy of letting an aneurysm alone usually led to disaster; but what was the exact frequency of such disaster we have no figures to show, nor are we likely to have in the future.

[illegible] following gunshot injury is somewhat more favourable. During the first few weeks, at any rate, some of the cases improve; the [illegible] arteriovenous aneurysm may be converted into the much less [illegible] aneurysmal varix.

Treatment by Compression has almost been given up, except where operation is quite impossible. It is painful and tedious (the average [illegible] in 26 cases was nineteen days). It only cures a minority of the [illegible]. Barwell found that of 148 instances of popliteal aneurysm treated by compression between 1870 and 1880, 68 succeeded and 80 failed. It may reduce the prospects of success of the subsequent [illegible] by dilating up the collateral circulation.

Ligature of the Operation.—We are greatly indebted to the excellent studies of the literature by Monod and Vanwerts for our knowledge of the end-results of the various methods of treatment of aneurysm. They have done their best to eliminate the usual fallacies of statistics collected from recorded cases instead of consecutive hospital series, [illegible] it is probable that successes and new methods figure a little too prominently even in their carefully-compiled tables.

In a study of 410 recorded cases, they found that after proximal ligature about three-quarters were cured, 12 per cent failed, and 6·5 per cent suffered from gangrene. There was [illegible] persistent pain from adhesions of nerves to the sac.

Of cases treated by extirpation, 90 per cent were cured, and 4 per cent developed gangrene.

Of 105 cases treated by Matas' method of aneurysmorrhaphy, conserving the artery if possible, 85 were cured and 12 died.

Their results may be set out in tabular form thus:

ANEURYSMS OR OLD ARTERIAL HÆMATOMATA.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ligature - - -	138	74	7	6·5	12
Extirpation - - -	205	90	3	4	1·5
Antyllus -	41	80	17	2·5	0
Aneurysm. oblit.* - -	62	88	8	7·5	0
Op. conservativ.† - -	46	73	20	0	22

[illegible]

The following tables are quoted by Tscherniachowski from various sources to illustrate the frequency of occurrence of gangrene after various older methods of operation:—

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Monod and Vanwerts	Ligature -	10	0	68	11·7	78	10·2
	Antyllus -	5	0	19	5·2	24	4·1
	Extirpation	32	0	145	6·2	177	5
Wolff	Ligature -	12	16·6	71	19·7	83	19·3
	Antyllus -	2	0	5	20	7	14·2
	Extirpation	11	0	44	18·1	55	14·5

After aneurysmorrhaphy, gangrene occurred in 3·3 per cent. and recurrence in 2·7 per cent, of 149 cases extracted from the literature by Gardner (1910).

We shall now take up the principal arteries in turn.

Popliteal Aneurysm.—Of 20 cases treated by the older methods in the London Hospital, ligature in Scarpa's triangle gave the best results, but the literature quoted above shows that extirpation is better on the whole.

Monod and Vanwerts compare the older methods of treatment with the conservative operation of Matas, as shown in the following

Other [illegible] the result is not known, hence the tables appear not to balance.

Conservative operation	38	32	88.8		6		0		4	[illegible]
Non-conservative operation	206	180	87.4	5	2.4	11	6.8		6	3

Gangrene has, however, been known to follow aneurysmorrhaphy. It will be seen that the proportion of cures is about the same: the ligature and extirpation methods run more risk of gangrene, whereas the Matas operation is more likely to be followed by recurrence.

Femoral Aneurysm.—Here again the cures are about the same with the older and the newer methods, and one has to balance risks of recurrence against risk of gangrene.

Monod and Vanwerts have obtained the following statistics from the literature:—

Conservative operation	34	31	91%	2	5·8%		0		1	3
Non conservative operation	166	149	90%	11	7·2%	7	4·3%			0

The authorities differ as to whether, if ligature is adopted, it is wiser to tie the common femoral or the external iliac, the former being more likely to cure the aneurysm, and the latter more likely to avoid gangrene. No doubt, when feasible, the best of the non-conservative operations would be the Antyllian or extirpation.

External Iliac Aneurysm. This rare disease may be treated by ligature of the common iliac artery by the intraperitoneal route, by extirpation, or by aneurysmorrhaphy. Matas gives the results as follows, using only post-1880 evidence, but the data are not very [illegible] forth.

Ligature	21	[illegible]	10	7	2
Extirpation	5	4	0	1	0
Aneurysmorrhaphy	7	4	3	1	1

Of the 7 patients treated by Matas' method, one became gangrenous and died, another relapsed and ruptured, and a third died of pulmonary embolism. The others appear to have been cured.

Monod and Vanwerts report 9 cures and 10 deaths after various operations.

Gluteal Aneurysm. There appear to be no reliable figures relating to the treatment of this condition which do not go far back into pre-antiseptic times, and are therefore valueless. Delbet reports 12 cures of 14 cases cured by the operation of Antyllus. Bergmann teaches that cure can often be obtained by the injection of ferric chloride, and Vanwerts declares that ligature of the internal iliac gives excellent results.

Subclavian Aneurysm.—Monod and Vanwerts report :—

	Cases	Cures	Deaths	Failures
Proximal Ligature - -	63	44	9	10
Extirpation - - -	11	10	0	1

For many years a curious fatality hung over the operation of tying the first part of the subclavian, and the first 19 cases all died, but the first 10 French cases have all recovered (up to 1911).

Axillary Aneurysm.—Using once more the statistics of Monod and Vanwerts :

	Cases	Cures		Deaths		Failures		Failures	
Conservative operation -	6	4	66·6%	1	16%	1	16%	1	16
Non conservative operation - -	63	51	81%	3	4·7%	2	3%	5	8

The non-conservative operations include ligature of the subclavian, extirpation, and the method of Antyllus, whereof extirpation, when possible, is the best.

Innominate Aneurysm.—It is very seldom possible to apply a proximal ligature, but a considerable number of cases have been treated by tying the carotid and subclavian arteries. In the older literature there was a heavy mortality from sepsis and hæmorrhage, and out of 120 cases only 7 cures resulted (Jacobsthal); but Vanwerts is able to quote 77 recent operations, whereof 14 per cent died, 57 per cent improved, and 19 per cent failed.

Carotid Aneurysm.—Monod and Vanwerts could only find one case of aneurysmorrhaphy, which was fatal. The results of the older methods may be set out thus :—

	Cases	Cures	Deaths	Failures
Ligature - - - - -	16	13	0	3
Extirpation - - - -	17	14	3	0
Incision - - - - -	3	2	1	0
Aneurysmorrhaphy - - -	1	0	1	0

Arteriovenous Aneurysm. This is usually the result of a stab or bullet wound, and, as Makins has pointed out, it is wise to wait some months after the latter injury before operating. Mere proximal ligature may reduce it to an aneurysmal varix, but will not be curative; the essential point is to separate the artery and the vein. Vanwerts has collected 15 cases of quadruple ligature of the artery and vein each above and below; 3 became gangrenous, and 9 were cured. Extirpation practised in 117 cases gave 95 per cent of cures and 1·7 per cent mortality. Nowadays arteriorrhaphy might well be tried.

Gangrene is of course more likely to follow operation on the common femoral or popliteal than on the vessels of the arm or the superficial femoral.

Aneurysmal Varix. In the great majority of cases this does no harm and a bandage is sufficient treatment. If it is necessary to do anything, the best results have followed ligature of the artery above and below; simple proximal ligature is futile. Arteriorrhaphy would be worth a trial.

No figures are yet available, on a sufficient scale, to show the end-results of treatment of aneurysms following gunshot injury in the Great War but in general terms it may be stated that in early cases operated on within a few weeks for urgent symptoms the outlook is worse, and in later cases better, than in spontaneous aneurysm. Arteriovenous aneurysmorrhaphy has very seldom been found suitable. Excision has been the method of choice.

References. *Keen's Surgery*, 1909, vol. v, article 'Aneurysm'; Tschertschowski, *Deut. Zeits. f. Chirurg.* 1913, June, 1; Monod and Vanwerts, *Rev. Chirurg.* 1911, 663.

A. Rendle Short.

ANGINA PECTORIS. When we say of a patient that he is suffering from angina pectoris, we mean that he is troubled by bad attacks of cardiac pain, which constitute a prominent feature of his case. An account of the prognosis in angina becomes, therefore, an account of the prognostic significance of a symptom, and not a summary of the menaces contained in a definite disease. Angina pectoris will here be spoken of as a symptom of organic disease of the heart; imitative attacks will be alluded to at the end.

True angina is always evidence of one thing—impaired contractility in the wall of the left ventricle. This is often (but not always) associated with interferences in the supply of blood to the myocardium, through the coronary arteries. Now inadequacy of contractile power in the ventricular myocardium is a serious matter, and any lesion that can produce it is a veritable shell in the engine-room. The first statement to be made, therefore, is that angina is always a grave symptom in any case of cardiac disease. Its appearance in a patient who has never shown any previous evidence of a lesion of the heart must always call for a minute investigation of the case from every point of view, to ascertain the precise nature of the injury that is causing it. On the other hand, when a patient who is known to

[illegible] a damaged heart has his first experience of angina, the prognosis is much graver than before, simply because it shows that the vital act of his heart, the muscle of his left ventricle, is becoming unequal to the demands which are being made on it. It must be added that the first occurrence of angina introduces into the case a risk of sudden death; this point will be examined in detail later. The average period elapsing between a first attack and the patient's death is not easy to ascertain.

General Outlook. In order to determine the outlook in any given case of angina, four points require to be examined: (1) *The nature of the cardiac lesion*; (2) *The circumstances preceding the attacks*; (3) *The nature of the attack itself*; and (4) *The condition of the heart after the attacks cease.*

1. *The Cardiac Lesion.* Angina pectoris occurs in connection with acute as well as with chronic disease of the heart, but far more frequently with the latter; probably because any acute disease which injures the myocardium severely enough to cause angina will quickly lead to a fatal issue. From the prognostic point of view, a classification which divides the myocardial states responsible for the occurrence of angina into those which are primary and those which are secondary has more value than a division into acute and chronic lesions. The primary conditions are those in which the myocardium itself is diseased; the chief examples of these are cardiosclerosis, cardiac syphilis, alcoholic degeneration of the myocardium, and acute infection of the myocardium in such diseases as rheumatism and typhoid fever. The secondary causes of angina are those in which the myocardium is relatively free from disease, yet unequal to some abnormal circulatory strain thrown upon it, the chief examples of which are disease of the aortic valves and high arterial tension. Even this classification has only a limited value, for the two classes overlap at certain important points; for instance, cardiac syphilis and disease of the aortic valves frequently coincide; so also do cardiosclerosis and high blood-pressure. Nevertheless, the classification is of some service in the present connection if it emphasizes the fact that the outlook is graver in those cases where angina is directly connected with disease of the myocardial tissues than in those where a fairly healthy myocardium is confronted with a task too heavy for it.

In determining the nature and seriousness of the cardiac lesion responsible for anginal attacks, therefore, it is necessary to gain an idea of the state of the myocardium, the arteries, the arterial tension, and the valves of the heart. All signs pointing to gross disease of the myocardium make the prognosis graver; such signs are feebleness of the pulse and heart-sounds, embryocardia and gallop-rhythm, the alternating pulse, dyspnœic attacks too readily provoked, œdema of the ankles. On the other hand, if the impulses be powerful and heaving, and indicative of hypertrophy of the left ventricle, and signs of some extraneous cause such as aortic incompetence or high

arterial tension be present, the prognosis is better, and particularly where the extraneous cause is one that can be modified and reduced by treatment (high arterial tension), or is, at least, not progressive (post-rheumatic incompetence of the aortic valves in an adult). Of course, very high tension that does not yield in the least to treatment is a [illegible] cause of angina, for it is likely to be progressive. Again, [illegible] a symptom of aortic insufficiency is of far more sinister import when associated with syphilitic disease of the aortic valves than in cases of post-rheumatic valvular disease; for in the former case there is sure to be progressive myocardial disease associated with the valvular lesion; whereas, in the latter (provided the patient be over twenty), the risk of direct myocardial injury is remote, and such myocarditis as may occur tends towards recovery and is not progressive. The aortic incompetence of general atheroma lies midway between the two; the myocardium is directly attacked through disease of its nutrient arteries, and it will become worse, but not rapidly so, as in the case of syphilis. Sometimes, of course, the prognostic import of the angina is overshadowed by that of other findings, as when signs of aortic aneurysm are discoverable.

A general rule applicable to all cases of angina, however, is: the worse the myocardium, the worse the prognosis. The marks of a bad myocardium are to be found partly in the patient's own statement, partly by physical examination, and partly by inference.

2. *The Circumstances Provoking Anginal Attacks.* These circumstances are of various kinds: the chief are exertion, emotion, meals, and [illegible] In a number of cases no provocation is discoverable, the patient being at rest while the patient is at rest in bed. Two obvious [illegible] into the mind at once, or rather, two aspects of the same generalization. The first is that the more readily the attacks are provoked, the worse the prognosis. There is much less [illegible] in angina which comes on in the middle of a sprint to the station than in that which brings to an abrupt termination an attempt to walk up a barely perceptible incline, even though the former be the severer attack. The second is that if the provocative cause be a controllable one, the outlook is by so much the better. Obviously the man who only gets angina after overloading the stomach is in a better case than the one whose attacks are provoked by all sorts of causes, and by no apparent cause at all. In this sense, it is better to have one cause for the attacks than many; for example, the man who only gets attacks when he stoops to tie his boots up can foresee his danger and circumvent it by taking care, while he who never knows what petty excitement or effort may throw him into pain cannot be so prepared forewarned and thereby forearmed. In this connection, the patient's temperament is important: the headstrong man who will not be advised, most expert of consequences, if he will not control his activities and live within the limitations of his myocardium. If he can and will avoid such circumstances as have been learned to provoke attacks, the prognosis is better.

3. *The Nature of the Attack itself.*—Here it must be acknowledged that *a priori* reasoning is singularly apt to mislead. The severe attack is not necessarily more dangerous than the slight one. Patients have been known to live for years after a tremendous bout of prolonged agony of mind and body, while others sink rapidly after an attack which was so slight as to be misinterpreted at the time. The one line of inquiry into the nature of the attack which goes to the root of the matter is that which seeks to discover whether or no there are evidences of grave myocardial embarrassment during the paroxysm. Thus, the prognosis is worse if the attack be accompanied by respiratory changes (grouped breathing or 'cardiac asthma'); so, also, if the pulse become slow and there are evidences of heart-block, or if the patient faint during the paroxysm. Such data are of much more importance than the severity and distribution of the pain. One point that gives some help is the effect of vasodilators; attacks that are readily relieved by the exhibition of nitrites are less portentous of evil than those that are refractory to treatment, presumably because the angiospastic factor, the one which is neutralized by nitrites, is less threatening than the myocardial, which is influenced only indirectly by this form of treatment.

4. *The State of the Heart after the Attack.* This is of the greatest importance. Here, again, it is the condition of the myocardium that matters: has it been definitely and perceptibly worsened by the attack, or by the changes which provoke it? Two or three examples will serve to illustrate this point. A strong man of over seventy had for some time been getting shorter of breath, but there had been no pain till one day after walking up a very gentle incline: even then it was not very severe, and soon passed off under treatment. However, the heart-sounds were feebler after it than before, the patient was paler and more breathless, and the feet began to swell; in a few days he died rather suddenly in his arm-chair. In another case, a patient with aortic regurgitation of the atheromatous type, who had survived years of anginal attacks, one, at least, so severe and obstinate as to necessitate the use of chloroform, died within a few days of a comparatively slight seizure of pain, which was followed by the appearance of a pericardial rub with quickening of the pulse. A third patient, who had been troubled with severe angina for over a year, had a sudden attack in bed one day; on the following day his cardiac dullness had perceptibly increased, and a pericardial rub was heard; a day later he died suddenly in bed. In this last case a right ventricle was found ruptured at the autopsy. Anything which points to the myocardium having taken a downward step during the attack points also to an active degeneration in progress and therefore to an early termination. Signs of pericarditis are particularly ominous, for they are manifestations of some gross change in the cardiac muscle, such as infarction or rupture.

So much, then, for the general outlook in any patient with anginal attacks—it all turns on the state of the myocardium before, during,

and after the attack, and the degree of overstrain needed to bring out that inadequacy of which angina is a symptom.

There are, however, two other questions which we must be ready to answer: the likelihood of sudden death, and the probability of recurrences of that attack.

Sudden Death.—Patients who have had sharp bouts of angina do not ask about the risk of sudden death: they have tasted its bitterness already, and know so much of the danger that they do not care to know more. The relatives, however, not seldom want to know "whether he is likely to go off in an attack": and this is not unreasonable, for the patient looks more than half dead if the paroxysm be at all severe. Further, writers of fiction and of medical text-books have insisted so much on the association between angina and sudden death that the two ideas have become inseparably linked in the public mind. Now, while it is perfectly true that in a few dramatic instances the heart stops during the paroxysm, it is equally noteworthy that a considerable majority of those who are subject to angina do not die during the attack. This having been explained to the friends, it is advisable to give a rather fuller explanation of the risks of sudden death implied in anginal attacks: that although the onset of cardiac pain must not be regarded as necessarily threatening imminent death, yet the very occurrence of such attacks is a warning that the muscle of the heart is barely equal to its work; that it may fail abruptly or acutely with or without forewarnings of pain; and that death is apt to follow attacks of pain after an interval of days or hours. The actual imminence of sudden death, in any given case, depends entirely on the conditions found to underlie the patient's liability to angina; those points to which attention has been directed as giving a key to the general prognosis in any given case will also assist in an estimation of the risk of sudden death.

Recurrence.—Another question that the patient may dare to ask for himself after the first attack bears on his liability to a return of the experience. Now he may be quite truly assured that it is possible that he may never have it again, particularly if that which provoked the first attack be some avoidable circumstance, such as going out insufficiently clad on a frosty day, over-eating, and the like. A surprisingly large number of persons have only one attack, or else a few attacks at long intervals; while some go through a series, and come out into smooth water again. Such good fortune falls especially to those whose heart is in fair condition, but overtaxed by a high arterial tension, or by leaking aortic valves and a laborious occupation; and only to such of these as are willing to go softly. Indeed, it is here that the whole philosophy of angina comes in. Pain is a warning, a protective phenomenon, which says to its victim, "Don't do that again": if the anginal patient will listen to this advice, he may escape further punishment. Where, however, the heart is the seat of syphilis or the arteries are profoundly degenerated, the friends must be warned of the likelihood of recurrences, and of

all that we have seen implied in them. Moreover, it is well to bear in mind the fact emphasized by Mackenzie, that cessation of pain is not always a good prognostic sign: if accompanied, as it sometimes is, by the onset of mitral insufficiency, with anasarca and increasing dyspnœa, the patient may be regarded as having entered on the last stage of his journey, even though he may never again have any suspicion of angina.

Pseudo-angina.—A final word remains to be said about the shadowy group of cases designated 'pseudo-angina,' 'toxic angina,' and so on. Climacteric women are liable to attacks of pain which is more or less obviously cardiac; and over-smoking may bring on the same kind of trouble. Obviously, such attacks, which do not depend for their origin on organic disease of the heart, do not carry with them any menace to the patient's life; moreover, they will cease to occur when the cause has ceased to operate. The whole difficulty of prognosticating truthfully in such cases, then, lies in diagnosis of the cause or causes of the attacks. The task is to find out whether or no we are dealing with a sound myocardium: if the physical signs and other circumstances (the patient's age and his possible consumption of tobacco, nature of attacks, and so forth) point away from serious disease of the myocardium, then the prognosis is good.

Indeed, this is the whole secret of successful prognosis in cases manifesting angina pectoris. It is a symptom of myocardial insufficiency, and the prognosis varies directly with the state of the myocardium: *good heart muscle, good prognosis; bad heart muscle, bad prognosis.*

Carey F. Coombs.

ANKYLOSTOMIASIS.—By ankylostomiasis we mean the anæmia produced by a large number of ankylostomes in the bowel for a considerable period of time. In addition, about 80 per cent of healthy persons in many parts of India harbour a few worms without any appreciable harm, but may be a source of infection. When from several hundred to several thousand are present for months, they produce serious and sometimes fatal disease if not detected and efficiently treated in time. In Porto Rico, Ashford estimated that about 30 per cent of the total mortality was due directly or indirectly to this scourge, while the general health of a much larger proportion of the people was seriously affected. It is not possible to give any figures of the case mortality, as it varies so much with the severity of the infection and the circumstances in which the patient is placed for obtaining treatment.

In advanced cases with general anasarca, sometimes including ascites, the prognosis is grave, as even removal of the worms may leave the patients too debilitated to recover, and they easily succumb to any intercurrent disease such as pneumonia, etc. In typical cases the red corpuscles may commonly be reduced to under 2,000,000 and the hæmoglobin to about 20 per cent, the colour-index being

always low, yet recovery may take place under careful treatment. Extremely low blood-counts, together with excessive dropsy, loss of digestive power, and albumin in the urine, are of grave prognostic significance, and any complication, such as malaria, adds to the gravity of a case. There are few diseases in which the prognosis is so rapidly improved by adequate treatment with one of the effective vermifuges; but in advanced cases caution is required in giving large doses of the more drastic remedies, such as thymol and beta-naphthol.

Leonard Rogers.

ANTHRAX.—The outlook in cases of malignant pustule is much better now than in days gone by, and has been still further improved by the introduction of antitoxic sera such as Sclavo's and Mendez's. In the years 1850–1886, Koch reported a mortality of 39 per cent, and in 1905 Lange estimated the English mortality as 26·5 per cent (261 cases), and the German as 13 per cent (446 cases). Since that time Hennemann has collected statistics which show a marked improvement, and gives us some guide as to the relative value of different methods of treatment. He collects from the literature :—

268	cases treated by various ointments and lotions	9·3 per cent died.
814	" " excision, cautery, caustics ..	7 "
1073	" (Buenos Aires) treated by Mendez's serum	4·2 "
80	" " Sclavo's serum	3·7 "

The mode of obtaining these figures probably makes them too favourable, as literature reports are notoriously apt to publish the successes and let the failures drop into oblivion; but many years ago Lengyel and Korányi, in a consecutive series of 146 cases treated surgically, were able to report a death-rate as low as 9 per cent, so probably it is fair to take the mortality in the serum cases as 5 per cent, and in those treated by excision as 8 to 10 per cent.

The disease is nowadays becoming uncommon in most parts of England. During the Great War my colleague, Captain Kirby, at a cavalry remount station, treated 5 cases successfully with serum, without excision of the wound.

Much depends on the time at which the patient is first treated, these good results being only obtained in early cases. If the patient dies it is usually on five to eight days, and spontaneous cure is said to be [illegible]. It would be difficult to verify this statement in a hospital, for as a rule every case seen would be treated.

When [illegible] the prognosis is unfavourable, and [illegible] and neck are more than twice as dangerous as those of the [illegible]. When the temperature is high and the patient shows [illegible] of septicæmia or infection, recovery is unlikely.

Woodsorters' disease, that is, a general infection either of the lungs or intestine, or [illegible] pustule, is happily rare, but is extremely fatal.

[illegible] *Deut. Zeits. f. Chirurg.* 1912, 309.

J. Rendle Short.

ANTRAL EMPYEMA.—*(See* NASAL ACCESSORY SINUSITIS.)

ANTRUM, GROWTHS OF. *(See* JAWS, TUMOURS OF.)

ANUS, IMPERFORATE.—Many years ago, Harrison Cripps made a study of the operation mortality in this condition under various circumstances. He pointed out that although the prognosis apart from operation is, of course, hopeless, except in cases where the rectum opens into the vagina, yet occasionally the children may survive for a surprisingly long time; one infant at St. Bartholomew's Hospital, whose parents refused operation, was still alive a month later, vomiting fæces three times a day!

MORTALITY IN NINETY-EIGHT CASES TREATED BY DIFFERENT OPERATIONS.

Dissection from the perineum	37	14
Puncture from the perineum	17	14
Coccyx resected	8	5
Opening into vagina	14	1
Iliac colostomy	16	11
Lumbar colostomy	3	2
Miscellaneous	3	3

A study of 37 cases of this condition, treated at St. Thomas's Hospital, shows how few of the infants grow up to adult age in reasonable comfort. An exception must be made in favour of little girls with imperforate anus and recto-vaginal fistula. These survive, and at a later period a plastic operation can be performed. It will be very difficult to get control without stretching, however. The writer has seen one such patient treated with fair success.

Of the 37 cases referred to, 20 died in hospital: 2 of peritonitis, 5 of shock, and 13 after laparotomy or colostomy. Of the 17 who left hospital alive, 10 have been lost sight of. Of the other 7, 2 died, aged nine and twelve months respectively, of deaths probably unconnected with the anal condition; 1 died, aged two months, of 'wasting'; 1 died, aged four months, of intestinal obstruction; 1 died, aged three years, after operation to close a colostomy; 2, aged nine and seven years respectively, are still living, one quite well, the other with recto-urethral fistula.

Cripps gives case-histories of a number of successful recoveries.

It is probably fair to conclude that about half the patients operated on die almost at once, and that about half of the survivors die in early infancy. A quarter of the total might survive, as far as the anal trouble is concerned, but some of these are in permanent discomfort. The most favourable cases are those with only a mere septum separating

[illegible]

[illegible]

AORTA, DILATATION OF. [illegible] to the great symptomatology [illegible] of the aorta. The [illegible] to enlighten us as to the [illegible] While it would [illegible] of this condition [illegible] the factors which enter into its production. These are two, the *dynamic* and the *degenerative*.

Dynamic Origin. The simplest example of this kind is to be found [illegible] aortic valves: here there is little question of any degeneration of the aortic wall: for though the [illegible] process is unlikely to injure this structure, it seldom does so to any intense or abiding extent. Yet in many cases of long-standing aortic regurgitation, there are the clearest evidences of a diffuse enlargement of the arch of the aorta: so much so, indeed, that many writers have recorded such cases as examples of 'rheumatic aneurysms.' The explanation is not hard to find: each ventricular systole throws an excess of blood into the aorta and overdistends it. Clearly, there is no question of prognosis here apart from that of the disease itself.

Degenerative Origin. This type of dilatation, on the other hand, is perfectly exemplified in syphilis of the aorta. Here we have to deal with an actual and progressive disease of the aortic wall.

Mixed Origin. A combination of the two factors is encountered in cases of aortic dilatation combined with high arterial tension: in such cases the aorta [illegible] because it is subjected to an abnormal tension [illegible] than merely because it is [illegible] in most cases, [illegible] Even here, however, the [illegible] The fact that the aorta is dilated [illegible] to prognosis, that the fact that the arterial pressure is raised.

It [illegible] the [illegible] of the etiology of aortic dilatation [illegible] the [illegible] case is that of atheroma [illegible] the reader to the article's [illegible] with [illegible] high arterial tension, [illegible] attempt to forecast the future of a case wherein [illegible] the dilatation.

(Sir) T. Lauder Brunton.

AORTIC DISEASE. (*See* Heart, Valvular Diseases of.)

APHASIA. The prognosis depends upon the underlying cause. Most cases of aphasia are the result of [illegible] lesions of the cerebral cortex [illegible] due to cerebral [illegible] lesions.

others, the majority, are due to arterial thrombosis; whereas cerebral haemorrhage is relatively uncommon as a cause. In embolic cases, the arterial obstruction usually reaches its maximum at once, and does not tend to extend. In thrombosis, on the other hand, there is a tendency for the lesion to spread and become more extensive, corresponding to the amount of disease in the cerebral arteries. Cerebral thrombosis occurring in the early half of adult life is most likely to be syphilitic in origin; whereas, after middle life, arteriosclerosis may occur, not only from syphilitic disease, but also from senile arteriosclerotic changes. Syphilis should always be looked for by the various tests at our command, since syphilitic cases have a better prognosis if promptly treated, than non-syphilitic ones. Cerebral abscesses (most commonly in the left temporal lobe) and meningitis are among the less common organic causes of aphasia; whilst cerebral tumours are still more infrequent, producing aphasic symptoms either by direct infiltration of the speech centres or, more usually, by compression.

In many cases of aphasia from organic disease, there is a co-existent right-sided hemiplegia, more or less profound according to the situation and extent of the brain lesion. It is important, however, to remember that it is the cortical part of a brain lesion which is mainly responsible for the aphasic symptoms, and that deeper-seated lesions of the white matter may produce the most profound hemiplegia without any evidence of aphasia.

In organic lesions which are still advancing (e.g., in spreading vascular lesions of any sort, in cerebral abscesses, meningitis, or tumours) aphasia is not likely to improve; on the contrary, it tends to get worse. But in cases where the organic lesion has come to a standstill (e.g., after an attack of cerebral embolism or thrombosis, after successful evacuation of a cerebral abscess, or after relief of pressure by removal of a cerebral tumour (provided the tumour has not infiltrated the speech centres, but only compressed them)—the speech centres, or so much of them as remains undamaged, may gradually resume their function; whilst the subsidiary speech centres in the opposite side of the brain may, by education, undergo development.

The degree which such compensatory activity of the speech centres may attain is very variable. The prognosis is best in children; under the age of five or six years, provided no profound dementia be present, compensation practically always occurs, and the aphasia usually clears up completely. In old age, on the other hand, the probabilities of re-education of subsidiary speech centres are very remote, and little or no improvement is to be looked for. In early adult life, or middle age, individual variations are so great that an accurate prognosis in any particular case is well-nigh impossible. Patients with word-deafness are more difficult to re-educate than those with word-blindness. The co-existence of word-deafness and word-blindness in severe degree renders re-education impossible, while the absence of both word-deafness and word-blindness, as in simple motor aphasia, renders the prospects relatively much more favourable.

Temporary Aphasia. A transient aphasia, usually slight in degree and characterized mainly by a difficulty in naming objects, may arise from debility or exhaustion in an otherwise healthy person. In other cases the condition is due to temporary slowing or stasis of blood in the cerebral cortical arteries, and such attacks are to be regarded as warnings of threatened thrombosis, and call for energetic treatment of the arterial disease, especially if it be syphilitic in origin. Temporary aphasia also occurs from localized arterial spasm, the patient recovering suddenly and completely within a few hours. We also meet with it in general paralysis of the insane as part of a "congestive attack." Certain cases of migraine are preceded by an aura of temporary aphasia, usually accompanied by a subjective sensation of tingling in the right arm, face, and tongue, and followed by left sided headache. Aphasia may also be present for a short time after the occurrence of an epileptic fit, doubtless owing to temporary cortical exhaustion. Lastly, we may have temporary aphasia in uræmia, from toxic affection of the speech centres.

Purves Stewart.

APLASTIC ANÆMIA.—(*See* ANÆMIA, APLASTIC.)

APOPLEXY. (*See* STROKES.)

APPENDICITIS: Acute and Chronic.

ACUTE APPENDICITIS.

Results of Operation. In the year 1912 936 cases of appendicitis were admitted to the London Hospital. Among them were 38 cases which for one reason or another were not operated upon. 2 of these were moribund when they were admitted and died shortly afterwards. I have excluded these 38 patients, and completed a series of 1000 cases by adding 102 others, 70 men and 32 women, who were admitted to the hospital at the beginning of 1913.

Of the 1000 cases, 698 were operated upon during the attack, 302 during the quiescent stage. Of the patients who were operated upon, 32 died, which gives a mortality in all cases of 3·2 per cent. The mortality in the 698 acute cases was 4·3 per cent. Among the 302 operations performed between the attacks there were 2 deaths, a mortality of 0·7 per cent. These patients were suffering from actinomycosis of the appendix; death was due in both cases to extension of the disease, and did not follow immediately upon the operation.

Walker reports that 1169 cases of acute appendicitis were operated upon in the Edinburgh Royal Infirmary from October, 1910 to September, 1915. The total mortality was 7·3 per cent.

Stillman reports that in 965 cases of acute appendicitis operated upon at the Roosevelt Hospital, New York, during the years 1910–1915, there were 46 deaths, a mortality of 4·8 per cent.

These results compare well with the latest German statistics reported by Zeitler, who found that out of 308 cases of acute appendicitis

operated upon in the years 1911, 1912, and 1913, 30 died, a mortality of nearly 10 per cent.

I have divided up the 698 patients who were operated upon at the London Hospital during the acute stage into four groups, according to the condition found. In the first group are placed those patients who had general peritonitis: there were 80 of these, 16 of whom died, giving a mortality of 20 per cent. In the second group are 211 patients who had an abscess; 204 recovered and 7 died, giving a mortality of 3·3 per cent. In the third group are those who had local peritonitis only, including those cases in which the peritonitis was diffuse but did not involve the whole of the peritoneal cavity: these numbered 123 with 6 deaths, a mortality of 4·8 per cent. Finally, in the last group are placed those patients in whom the inflammation was limited to the appendix and there was little or no evidence of local peritonitis; in this group are 284 patients, 1 died; a mortality of 0·3 per cent.

Table A. PRESENT MORTALITY IN OPERATIONS FOR APPENDICITIS.

During quiescent stage -	302	300	2	0·7
During acute stage:				
General peritonitis -	80	64	16	20
Abscess - - -	211	204	7	3·3
Local peritonitis -	123	117	6	4·8
Inflammation localized to appendix - -	284	283	1	0·3
Total	698	668	30	4·3
Grand Total (all cases)	1000	968	32	3·2

From these statistics we can form some idea as to the prognosis in the different forms of acute appendicitis if the patient is submitted to surgical treatment: and for easy reference I have collected them together in *Table A*. It is, however, far more important to draw attention to the way in which the prognosis varies according to the time at which operation is undertaken. I found on examining the statistics of the London Hospital, that out of 162 patients who were operated upon during the first twenty-four hours of an attack, only 2 died, giving a mortality of 1·2 per cent: of cases operated upon during the second twenty-four hours of an attack, 152 in all, 6 died, a percentage of 3·9 per cent; whereas of those in whom operation was postponed until the third day of the attack, 115 in all, 10 died, or 8·7

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	160	2	1.2
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	146	6	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12	[illegible]	[illegible]	105	10	8.7
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	48	2	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	35	1	2.8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	24	0	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	41	3	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	0	0
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9	4	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	57	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	668	[illegible]	[illegible]

[illegible]

[illegible]

of the attack, but was postponed as long as possible in order to allow the attack to subside, or failing this, to allow the inflammation to become localized.

The earlier statistics illustrate the results of postponing operation; the present ones the result of operating early.

If all cases could be left with safety until the tenth day, the general mortality would be still lower than it is; but unfortunately they cannot, and it becomes our duty to remove the appendix at a time when the risk is reduced to a minimum, that is, during the first twenty-four hours, a procedure which offers the prospect of a mortality of only 1·2 per cent.

Complications of Acute Appendicitis. Unfortunately it is by no means rare for the patient's convalescence to be delayed by certain complications which may arise during the attack. Thus we find that out of 698 patients operated upon during the acute stage, in 85, that is 12·2 per cent., various complications arose. Among them were 25 cases of local fecalith, 22 cases of secondary abscess, 17 pulmonary complications, and 12 cases of intestinal obstruction. 4 patients had more than one complication. For example, of two of the cases of pelvic effusion, one was associated with a subdiaphragmatic abscess, and the other with bronchopneumonia; and the patient with empyema also had a subdiaphragmatic abscess.

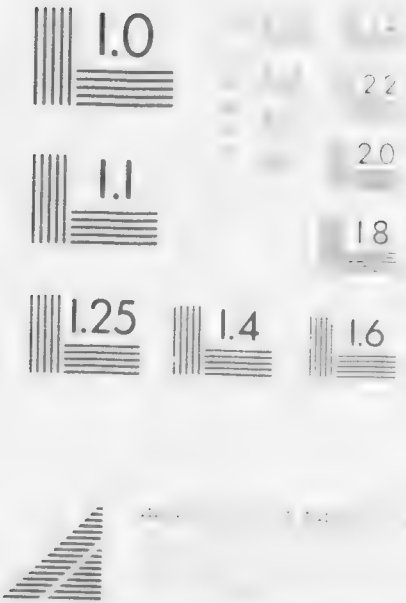
That 12·2 per cent. of all patients operated upon during an attack of appendicitis, or one in eight, should suffer from complications is very unsatisfactory, but even so it is a great improvement on former results.

The explanation of this improvement is easy; there can be no doubt that it is due to operating early instead of postponing it until the patient has developed an abscess or general peritonitis. For on investigating the 85 cases in which complications arose, we find that in all but six there was an abscess or peritonitis, general or local; in the great majority an abscess or general peritonitis. Of the 6 cases in which the inflammation remained localized to the appendix, 1 was a case of intestinal obstruction in which the appendix itself formed the obstructing band, and probably became gangrenous in consequence of the cutting off of its blood supply by the stretching of the appendix and its mesentery.

Secondary Abscess. Secondary abscesses form a large proportion of the complications, for, as will be seen on reference to *Table C*, a secondary abscess developed in no less than 22 of the 85 patients, apart from the four patients who had a subdiaphragmatic abscess. The majority occurred in the pelvis, in the rectovesical pouch, as a natural consequence of the routine adoption of the valuable Fowler's position, which causes all free fluid in the peritoneal cavity to gravitate to the pelvis.

But the number of these cases of secondary abscess is unnecessarily large, for it is due, I think, to inadequate drainage. A few years ago there was a tendency to leave drainage tubes in too long; more recently

MICROCOPY RESOLUTION TEST CHART



the patient work done by Barnard in the Hospital, and also the various alterations in our methods of diagnosis and treatment.

We must regard a subdiaphragmatic abscess as a [illegible] complication. For although the total [illegible] mentioned abscess [illegible] the number is too small to justify any deductions as to the prognosis of this condition, nevertheless the fact that they occurred must be recognized. (See case Subdiaphragmatic Abscess.)

Faecal Fistula.—A faecal fistula is a most tragic complication when it is operated upon late in an attack. It is in those who have been operated upon within the first twenty-eight hours. It has occurred in the following cases:

1. Direct extension of the gangrenous process from the appendix to the caecum or ileum.

2. Incomplete excision of the appendix stump. This has occurred in cases in which only part of the appendix has been removed, as the proximal part could not be dissected out, or it has occurred in cases in which an overwhelming purse-string suture placed in the wall of the caecum round the insertion of the appendix has either cut through the inflamed and ordematous tissue or given way.

3. Actual bruising of the intestine at the time of operation.

4. Patches already ulcerated and eroded which were found in the adhesions which support them, perforate.

5. The pressure of a drainage tube on the intestine. In cases of localized suppuration, this pressure, combined with superimposed [illegible] to ulceration of the intestine with subsequent formation of a faecal fistula.

Most of these fistulæ can be avoided by early operation; the following case may be given as an example.

About two years ago I operated upon a boy of 18, thirty-six hours after the onset of the attack. The appendix was gangrenous and adherent, with it was a gangrenous patch on the caecum the size of a threepenny piece. The appendix was removed, the gangrenous patch of the caecum invaginated, and the patient made a rapid and uninterrupted recovery. If an early operation had not been undertaken, a faecal fistula would have been inevitable.

Of the 25 cases of faecal fistula there were only 4 in which the operation was performed within the first forty-eight hours. In the great majority of cases the faecal fistula followed an old-standing abscess. In the present series faecal fistula occurred 25 times in 698 appendicitis, or 3.6 per cent.

As regards prognosis, it appears, therefore, that in acute cases a 6 per cent of patients will develop a faecal fistula. If, however, the operation is undertaken within the first twenty-four hours, or even the first forty-eight hours, the chances of a fistula forming are so slight as to be negligible. Of the 25 patients with faecal fistula, 3 died.

The fistula itself, as a rule, closes spontaneously in the majority of cases within fourteen days. It is rarely necessary to operate; but if the fistula persists, the question of operation must be considered.

Thrombosis.—The most dreaded complication which is met with less frequently than formerly. Thrombosis of the femoral veins occurred [illegible] times in the right and twice on the left.

Pulmonary embolism usually does not take place before seven days after the beginning of the illness. There is first a slight rise of temperature, the tachycardia, the sudden pain in the affected leg, albuminuria, the centre of the clot with probably slight embolism of the lungs, and the next day the condition becomes more serious.

The first case was that of a boy with a retroverted abscess who had been ill for [illegible] days before his admission to the hospital. The second case, a female of [illegible] years, was taken ill [illegible] days after the first case, on the 17th day, a rigor of 5.5. Pus was no abscess, but the operation was abandoned, and death followed [illegible] days after. The fourth case was a woman of 65, who had a perforated gangrenous appendix and was said not to be a drunkard or a liar. In the last case there was the hemorrhagic form of the perforated and has to be considered post mortem [illegible] thrombosis. All four patients recovered.

In [illegible] the prospect of a case of [illegible] thrombosis, one must remember the danger of the [illegible] perforative embolism, and [illegible] Hoffmann [illegible] 21 of 21 patients who had [illegible] 22.

[illegible] of these [illegible] to good [illegible] Wesener [illegible] to [illegible] and [illegible] experiment.

Pulmonary Embolism.—In connection with thrombosis we must consider the embolism, a perforated condition of [illegible] embolism. In 3000 cases of appendicitis Hoffmann [illegible] 69 cases of thrombosis of the femoral veins and in [illegible] 22 of these gave rise to pulmonary embolism, 18 of the 22 cases proved fatal. McWilliam, in 8[illegible] cases, found 4 cases of pulmonary embolism, of which 3 died on the third, [illegible] and [illegible] days. In [illegible] these five reports [illegible] 26 cases, 21 died, a mortality of 80.8 per cent.

Gaston and Quenu allude to the frequency of pulmonary embolism in the statistics of different authors. They quote the following:

Lefferts	[illegible]	52.5 per cent. of 61 cases	85.5 per cent.
Vinay	10	23	43.5 "
Gebele	11	14	79 "
Wyder	8	12	66 "

The difference is probably due to the inclusion of slight cases by some authors, while others only recorded cases in which the symptoms were pronounced and severe.

Pulmonary embolism is perhaps the greatest dread of surgery, and any treatment which is ready to prevent this calamity should receive most careful attention. Hoffmann has obtained remarkable

[illegible] be [illegible] the patient stand up out of bed [illegible] the day after operation, and this is repeated on some [illegible] days. It is quite impossible for the patient to stand, passive [illegible] voluntary movements of the lower extremities are [illegible] and painful. His statistics embrace all cases up to the year 1912, and his treatment was begun in the year 1905. After the introduction of this treatment there were only 3 cases of thrombosis and embolism, compared with 36 in the previous series, and none of these three had been allowed to get out of bed the day after operation. This is most suggestive, and the treatment is worthy of more careful consideration.

The mortality of severe cases of pulmonary embolism appears to be about 75 per cent., but as was pointed out by Sir Douglas Powell it is not probable that many of the cases which are [illegible] as pneumonia and pleurisy, which arise as complications of appendicitis, are really cases of embolism. Furthermore, we can say that at the present time modern methods of treatment, but pulmonary embolism is an extremely rare complication of appendicitis.

In 1 case the pulmonary artery has been opened and the clot removed by Trendelenburg's operation. The patient successfully was a woman operated upon by Kroger. She had left office, and died suddenly after the operation, and died from pulmonary embolism.

Other Pulmonary Complications.—Pulmonary affections have been [illegible] in relation of the total number of the complications, viz., 17 out of a total of 88. Reference to *Table C* will show the relative frequency of these different conditions, bronchopneumonia heading the list, and pleural effusion coming second.

Empyema only occurred once, and then was in association with a subdiaphragmatic abscess.

Pleural effusion occurred in 4 cases. In one the patient had been three weeks and had a subdiaphragmatic abscess. The second patient was operated upon for general peritonitis on the third day of the attack, and developed double pleurisy and bronchopneumonia. In one of the other two patients had local peritonitis and the third was on the right side of the chest.

In the 8 other cases of bronchopneumonia and lobar pneumonia there was an abscess of peritoneum in 6. Bronchopneumonia developed in one case of acute appendicitis, in which inflammation was limited to the appendix, and in another urgent case, in which there were adhesions and free fluid in the peritoneal cavity, the patient had right lobar pneumonia.

A patient, age sixty-four, was had a perforated appendix and was operated upon four days after the beginning of the attack, died from bronchitis and heart failure.

These results are striking evidence of the relation between operation and pulmonary complications, and indicate the propriety of early operation during the first twenty-four hours of the attack.

Intestinal Obstruction.—Intestinal obstruction is a grave and not uncommon complication of appendicitis. I find that it occurred 19

[illegible]

[illegible]

[illegible]

proportion of 1·2 per cent in six cases. Among these 44 there were 14 cases of ileus, 7 of which recovered and 7 died. In the other cases, the appendix itself formed the constricting band in no less than 6 of these only 2 recovered and 4 died.

The frequency with which intestinal obstruction occurs depends largely on the time at which the primary operation is performed, as is the case with nearly all the other complications of appendicitis. It is interesting to note that in all of my 12 cases either an abscess or general peritonitis existed. None of these cases had been subjected to what is known as early operation, that is, within the first twenty-four hours, or even the first forty-eight hours. The real secret of successful treatment of intestinal obstruction in appendicitis is to prevent the occurrence.

The prognosis is grave. Out of the 12 cases in the present series 6 recovered and 6 died, while out of Rieger's cases 23 recovered and 21 died, a total of 29 recoveries and 27 deaths, giving the high mortality of 48·2 per cent.

In discussing intestinal obstruction due to appendicitis one must ever in mind the possibility of an attack of appendicitis leaving behind adhesions and adhesions which may cause intestinal obstruction at a later date.

Jaundice.—Speaking generally, when jaundice complicates an attack of appendicitis, the prognosis is grave.

Hoffmann has recorded 11 cases: in nearly all of them there was acute perforative appendicitis: in several, diffuse peritonitis or extensive abscesses. He regards jaundice as a sign of very severe illness, especially if it appears early in the attack.

Reichel thinks that jaundice may arise from the spreading of infectious material, and therefore advises that in the case of an abscess, one should be content with opening it and nothing more, when the disease has existed forty-eight hours. Eight of his 18 patients who had jaundice recovered—a mortality of 55·55 per cent.—but of Mitchell's 14 cases, 11 recovered and only 3 died.

Jaundice may be due to various causes and may appear at various stages of the illness. The following are the principal causes:—(1) Simple catarrhal jaundice; (2) Toxæmia; (3) Direct extension of the inflammation from the appendix to the gall-bladder and biliary ducts; (4) Pylephlebitis; (5) The so-called delayed chlorotoxic jaundice.

1. *Simple Catarrhal Jaundice.*—I recently saw a case of this sort in which the patient's illness began with vomiting; catarrhal jaundice shortly followed, and next day pain began in the right iliac fossa. Operation was performed within thirty-six hours and an acutely inflamed appendix removed. The jaundice followed the usual course of catarrhal jaundice and subsided in the usual way, after a brief period in which the stools were clay-coloured, the urine contained large quantities of bile pigment, and the skin and sclerotics were deeply tinged with yellow. This is the least serious form, and may be met with in

[illegible] the disease [illegible] appendicitis and [illegible] and [illegible] happened. In the above [illegible] described, the patient [illegible] the [illegible] of the [illegible] particular.

2. *Pneumococcus.* The pneumococcus [illegible] in which the jaundice appears [illegible] the [illegible]. A very [illegible] example of this kind has been [illegible] by Hartmann. The patient had well marked jaundice [illegible] appendicitis [illegible]. The abscess was opened and drained [illegible] the jaundice disappeared [illegible] days. In [illegible] of his experience [illegible] Hartmann suggests that when jaundice is present [illegible] appendicitis [illegible] the appendix [illegible]. [illegible] in which the jaundice appears in the [illegible] days after operation they probably [illegible] to the [illegible].

3. In the [illegible] *coli* [illegible] of [illegible] appendix [illegible] and [illegible] after [illegible].

4. *Polycocci.* [illegible] which [illegible] which the jaundice is due to [illegible] appendicitis. These cases are fortunately rare. In the 1000 [illegible] I reported in 1905 there were 3 of pylephlebitis [illegible]. In the present series there were 2 [illegible] the [illegible].

It is however important to remember that jaundice is not always [illegible] in these cases. In neither of the 2 reported by Bidwell, [illegible] were there jaundice.

The diagnosis of the condition is usually easy. The usual history is that a patient [illegible] acute appendicitis, the formation of an abscess, and after a certain interval the onset of rigors and a few days later, the appearance of jaundice. A little later still the liver may enlarge and become tender. The author has seen [illegible] that this is by no means invariable the sequence of events. I remember a patient who was [illegible] in the London Hospital under my care with jaundice [illegible] of the liver and tenderness in the region of the appendix. There was a history of an acute attack of pain on the right side of the abdomen three weeks previously. The temperature was normal. A diagnosis was made of acute cholangitis secondary to gallstones, but operation proved that the patient had pylephlebitis with a small intramural abscess and a perforated appendix.

I have been rather struck at the low cases which I have met with, by the operative method, of acute appendicitis, but this cannot be taken as a rule, for in 7 cases reported by Hartmann, 2 followed acute appendicitis, 3 after incision an abscess, and 2 after operation for diffuse peritonitis. Sasse however, reports 2 cases in which the appendicitis was of such a mild type that the patients were not confined to bed. But about ten days after the beginning of the attack they developed symptoms of pylephlebitis and died a few days later. The gravity of the condition lies in the fact that as a rule the liver is

[illegible] with small abscesses, and [illegible] by and [illegible] treatment. Of Hoffmann's 7 cases in one, 2 were there an abscess [illegible] large [illegible] and of these 1 recovered and the other patient died. In my own experience I have had 2 cases which recovered, one of them [illegible] with a large abscess which was drained, and the other a case of considerable interest, in which, on opening the abscess, I found [illegible] small abscesses, the size of a pea or less. The [illegible] *pyogenes aureus* was found in pure culture. Cultures were prepared, and the patient made a good recovery.

While the prognosis in cases of peripityphlitic abscess is [illegible] it is not hopeless, an exploratory operation should be performed, and the condition treated should with drainage where possible, otherwise by vaccines. It goes without saying that in these cases the primary focus of the disease, namely, the appendix, should always be removed.

With regard to prophylactic treatment, Wilms has published a very remarkable case in which he ligatured the efferent veins leading from the appendix. This patient had had two rigors, but after the veins were ligatured the rigors ceased and the patient made a good recovery, without gangrene of the intestine or any interference with peristalsis. Sprengel attempted to carry out a similar operation in a patient upon whom he had operated and from whom he had removed a gangrenous appendix thirty-six hours after the beginning of the attack. Nine days after removal of the appendix the patient had a rigor, and subsequently, two or three every day. Sprengel's attempts at ligature were unsuccessful, and a faecal fistula developed at the lower end of the small intestine, probably due to gangrene through interference with the circulation. As he points out, the operation is likely to be difficult enough in a normal subject in the absence of inflammation, if there is no mesentery to the colon, and where there is a large amount of subserous fat; but if, in addition, the structures round the appendix are acutely inflamed, it becomes almost impossible to isolate the veins; and even if the veins are secured, the danger of ligaturing the arteries as well, and so giving rise to gangrene, is very great.

5. *Delayed Chloroform Poisoning.*—In the last class I would place cases of so-called delayed chloroform poisoning. This most distressing condition I have met with in varying degrees on several occasions, but fortunately have only lost one patient through it. This was a considerable number of years ago, shortly after attention had first been drawn to the disease.

The patient was a little girl of eleven, upon whom I operated and removed an inflamed appendix within thirty-six hours of the onset of the attack. Chloroform was given and the operation was straightforward, but twenty-four hours afterwards she began to vomit. The vomit at first consisted of ordinary gastric contents, but later it contained altered blood and bile [illegible] and in abundance. With the onset of vomiting her mental condition became a little clouded.

[illegible]

[illegible] *The* [illegible] vomiting, [illegible] hours after the operation, and the case is [illegible]. I would, however, point out that acidosis is not present in all these cases.

Prevention [illegible]. Gelston, however, [illegible] believe [illegible] is [illegible], and that the administration of an anæsthetic [illegible] or during an attack, is [illegible] contraindicated [illegible] and should be avoided if possible. With regard to prophylaxis it is particularly important [illegible] freely, and not to purge them too drastically before the operation. Dextrose and soda bicarbonate should be given before and after the operation. With regard to the prognosis in these cases, many of them recover after prompt treatment by the administration of large quantities of dextrose and soda bicarbonate, and the mortality is far less now than it was before attention had been drawn to the condition and the proper treatment instituted.

Pylephlebitis.—This has been discussed at sufficient length in Class I. above. Apart from a case of [illegible], there was only one case in the present series, and that [illegible]. Jaundice, although present in a certain number of cases, is not necessarily a feature of pylephlebitis.

Gastric and Duodenal Hæmorrhage.—Melæna or hæmatemesis occurring in a patient suffering from acute appendicitis is a matter of grave importance, all the more so as in the majority of cases it is impossible to relieve the condition by surgical methods. In some cases the hæmorrhage comes from a duodenal ulcer, in others from the stomach, either from an acute ulcer or from numerous small erosions; in other cases again it may be impossible to say where it comes from, even on post-mortem examination.

About twelve months ago I operated on a patient who was suffering from an attack of appendicitis with a large pelvic abscess. He had been ill for two weeks. At the operation I removed the appendix and drained the abscess. All went well until [illegible] after the operation, when he suddenly collapsed; his face became blanched and his pulse

[illegible]

[illegible] operated 7 cases of [illegible] hemorrhage from 3 patients. There was [illegible] in the case of [illegible] and there was an abscess, and the other 3 were operated upon [illegible] Only one patient recovered. In the other [illegible] the hemorrhage came from a chronic gastric ulcer, manifesting itself as severe erosion of the gastric mucosa; in a third the patient had developed an ulcer for the severe hemorrhage; one patient died from hemorrhage in a few hours, seven days after an attack of appendicitis in the acute stage; there was no post-mortem examination; the seventh case was a boy who was taking a fair road toward recovery from general peritonitis, and died suddenly from a hemorrhage; the post-mortem examination revealed a duodenal ulcer with erosion of the splenic artery.

In 1908 Schwalbach collected 28 cases of gastro-intestinal hemorrhage after operations for appendicitis, and added 2 of his own. 17 patients died and 13 recovered. The mortality in his series was directly proportionate to the severity of the appendicitis: 9 patients had diffuse peritonitis; they all died. 8 patients had an abscess with localized peritonitis; 5 died and 3 recovered. 6 patients had acute appendicitis with only slight peritonitis; of these, 3 died and 3 recovered; 7 patients were operated upon during the quiescent period; these all recovered. One-third of the cases occurred in children. Schwalbach thinks that the hemorrhage is the result of thrombosis in the venous and arterial circulation in the omentum and mesentery.

Fortunately this is a rare complication; it only occurred once in our present series of cases, and the patient recovered. If, however, a patient who has been operated upon for acute appendicitis has an attack of gastro-intestinal hemorrhage, the prognosis becomes grave in direct proportion to the severity of the appendicitis.

With regard to treatment, if from the previous history of the patient there is good reason to suspect the existence of a chronic duodenal or gastric ulcer, and his general condition is satisfactory, surgical intervention is strongly indicated.

Hematuria.—Hematuria is a rare but interesting complication of appendicitis, and its pathology is still somewhat obscure. Slight hematuria may be caused by the rupture of an appendix abscess into the bladder, but the amount of blood is, as a rule, very slight, and there is but little difficulty in making the diagnosis. On the other

[illegible]

[illegible]

[illegible]

Bacteriology. [illegible]

found, but they usually place a subsequent part and only appear a [illegible] subsequent.

The prognosis in the case of a retroperitoneal infection is as a rule more serious than in the case of infection by the *Bacillus coli*. Keil states that the Streptococci pyogenes is especially associated with cases of [illegible] and is the usual cause of extensive and rapidly fatal peritonitis. This fact has received my own experience and I have frequently found it present in cases of severe infection, with gangrene of the appendix and perforation extension to the caecum. Those cases in which the infection has continued for a week or fortnight, and have involved the appendix, in spite of appendicitis satisfactorily drained, are not uncommonly due to Streptococcal infection. If the abscess is exploited, but other pus cannot be found, and what there is is pressed in small bags. If the adhesions are broken down to let out these small collections of pus, there is a great danger of fresh trouble.

Pregnancy. There has been a good deal of discussion on the relation between pregnancy and appendicitis, and the influence of the one upon the other. But the number of cases that have been reported is comparatively small, and it is therefore difficult to draw any satisfactory conclusions. In the present series there were only 2 patients who were pregnant, one three months and the other six months. In one the appendix was removed without the formation of pus or peritonitis. The wound healed by first intention, and the patient made an excellent recovery. In the other case the illness was of longer duration, and there was local peritonitis at the time of operation, but the patient recovered, pregnancy being undisturbed.

If a patient recently recovered from an attack of appendicitis becomes pregnant, is she likely to have a recurrence of the appendicitis during her pregnancy? Apart from the ordinary probabilities of a recurrence of an attack of appendicitis independently of pregnancy, we have to take into consideration the altered intra-abdominal conditions. These have given rise to a good deal of speculation on the part of various authors, with the result that exactly opposite opinions have been held. On the one hand, we can say that the constipation which is so frequently present in pregnancy is a predisposing factor, and would favour an attack of appendicitis. On the other hand, the connective tissue in the lower abdomen becomes looser and all the parts more vascular, which would not favour such an attack. But when we take into consideration the actual facts, we see that the number of women who suffer from appendicitis during pregnancy is extremely small. For example, among the 1000 cases of appendicitis which I collected in 1905, there were 399 females, and 6 of them were pregnant, a proportion of, roughly, 2 per cent. In the present series there were 401 females, 2 being pregnant, a percentage of about 0.5 per cent. The proportion is somewhat larger than that of such cases in the statistics of Sarnenburg and Kruegers, quoted by Renvall. Sarnenburg, among 2000 cases of operation for appendicitis on both

cases, had 4 cases of pregnancy, and Krogius, in 900 cases, had 1 of pregnancy. Renvall also quotes Fraenkel, who, out of 40,000 gynaecological and obstetric cases, had only 4 cases of appendicitis associated with pregnancy, and Schauta, who had 4 cases out of 30,000.

Now although it is obvious that when the total period of the pregnancies of any one woman is taken, it forms only a very small part of her life, the number of pregnant patients in the above statistics is so exceedingly small that it suggests that pregnancy does not have any particular influence in predisposing to an attack of appendicitis. Further, Renvall found that attacks of appendicitis, whether primary or secondary, depend but little, or not at all, on the month of pregnancy because the number of cases which occurred in the second and third months, when the uterus can exert no pressure and no traction on the appendix, was proportionately equal to those which occurred in the later months of pregnancy. We may therefore consider that the influence of pregnancy on the incidence of appendicitis is not proved.

We next pass on to consider the probable course of events in a patient who has an attack of appendicitis during her pregnancy. First of all one can say without hesitation that if operation is performed in the early stage, that is, within the first twenty-four hours, the prognosis differs very little from that in a patient who is not pregnant, and the same holds good for a certain number of cases of abscess, namely those which do not come into contact with the uterus. If, however, the uterus forms part of the wall of an appendix abscess, the prognosis becomes more serious. The great danger, of course, is the possibility of miscarriage or labour; for the rapid diminution in the size of the uterus will break down the adhesions and flood the peritoneal cavity with the pus which escapes from the abscess. Several cases have been reported in which the patient died from general peritonitis, the result of a ruptured appendix abscess, two or three days after labour.

With regard to the effect on the pregnancy, a simple appendicitis does not necessarily predispose to abortion or labour. On the other hand, if an abscess has formed, the prospects are not so good, for if it lies in contact with the uterus there is a considerable probability that it will bring about miscarriage or labour, a probability which becomes a certainty if there is general peritonitis. At the same time it must be remembered that abscesses have been evacuated without disturbing the pregnancy.

Lastly, with regard to the child: in nearly all cases in which appendicitis puts an end to the pregnancy, the child is born dead, or dies within a few hours of its birth. An interesting case has been reported by Pinar, in which the *B. coli communis* was found in pure culture in the vessels of the umbilical cord. Kromg also reported a case in which the *B. coli communis* was found in pure culture in the organs of the fetus, in the placenta, and in the large uterine veins.

What then is the best line of *treatment* to adopt in a patient who becomes pregnant shortly after an attack of appendicitis? If the attack was a severe one, I think that she should be advised to have

When to Operate [illegible]

attack whether it is going to be an abscess or not, or whether gangrene will set in. Any surgeon who has had a wide experience of appendicitis in these cases can tend to call to mind patients who presented all the signs and symptoms of a comparatively mild attack of appendicitis, but in whom a gangrenous appendix was found on operation. In conclusion, in discussing the important question of early operation, mention that out of 237 cases upon which he operated during the first forty-eight hours of the attack, 115, nearly 50 per cent, showed a gangrenous or perforated appendix.

Then again, apart from the very small mortality of operations performed during the first twenty-four hours, a point of great importance is this, that by operating early and removing the diseased tissue the chances of complications supervening are greatly diminished. This is particularly true with such complications as sinus and the great terrors of intestinal obstruction, thrombosis of the femoral or iliac veins, and so on. For example, if we compare the 1905 series of cases with the present series we find that the number of cases of fecal fistula has been reduced from 19 to 25, and of thrombosis of the femoral vein from 12 to 4. There were only 17 cases of perforative appendicitis as opposed to 15 in 1905, and 2 cases of fecal fistulæ as opposed to 4. Further, with very few exceptions, all the complications in the present series occurred in patients who had for some time previous to operation been suffering from other diseases of a grave pathological character.

Another point in favour of early operation, and from the present an especially grave condition, as the formation of an abscess or perforated appendix, is that in the great majority of cases it is possible to drain the wound and obtain union by first intention. When an abscess or perforated appendix is already present, the patient is ill, and we have to face the possible development of a secondary septic fever, and the subsequent risk of which is increased by these conditions.

Lastly, another point of considerable importance in the treatment of the first attack of appendicitis is essentially a human one, namely, and freedom from recurrence is the exception. The only way to operation, medical treatment may be successful in taking the patient over an attack, but the probability that further attacks will supervene is very great. Of 233 cases collected by Kennedy, 42 per cent had further attacks, 69 per cent in the first year, 29 per cent in the second, and 26 per cent subsequently. Of 1000 cases Kennedy found that 989, or 51·1 per cent, had had previous attacks.

When operation is performed in the early stage the appendix can be removed, and thus the possibility of further attacks is obviated.

Recurrence.—The question of recurrence must be considered from two standpoints. First, the probability of a patient who has an attack of appendicitis, mild or grave, suffering from a second attack; second, the recurrence of symptoms after operation, and third, recurrence after an abscess when the appendix has been removed. Statistics which are compiled in the present time are

the same value as those of five or six years ago, owing to the greater frequency of operative interference. For nowadays not only is it the rule for a patient who has an attack of appendicitis to be operated upon, either immediately or at the conclusion of the attack; but also many cases of chronic appendicitis, where there has never been an acute attack, are recognized and treated by operation.

The great tendency to recurrence is pointed out by Hoffmann, who found that of 2331 cases operated upon for appendicitis, no less than 1202, that is 51·4 per cent, had had previous attacks, and this, he says, was the underestimate, for in a large number of cases there was no mention as to whether the patient had had a previous attack or not.

I have already referred to Kaufmann's conclusions, viz. that of patients who are seen to have recurrent attacks of appendicitis, 80 per cent will have them within two years. But at the same time it must be borne in mind that attacks may recur after as many as twenty, twenty, or even twenty-two years have elapsed.

It seems possible that as the attacks are repeated they become less severe. In 1905 I found that of 200 patients who had an appendix abscess, 187 had had no previous attacks. This is still more striking in the case of general peritonitis. Of 35 cases in which allusion was made to the presence or absence of previous attacks, in no less than 31 the patients had not had appendicitis. Three patients had had one attack, and 1 patient had had two attacks. That is to say, in 88·6 per cent it was the first attack.

Table D.—Cases of Abscess and General Peritonitis admitted to the London Hospital from July 1, 1900, to Aug. 15, 1904, and their Relation to Previous Attacks of Appendicitis.

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Abscess	499	200	187	67	19	26
General peritonitis	101	66	31	3	1	0
Totals	600	266	218	70	20	26

These figures are of course small, and deductions from them must be made with some reserve; but it is reasonable to assume that the adhesions which result from the first attack tend to limit the inflammation in subsequent ones to the immediate neighbourhood of the appendix.

If the patient has had one undoubted attack, an operation for the removal of the appendix should be undertaken as soon as convenient. In the present state of our knowledge it is impossible to say with

certainty whether a patient will have further attacks or not. But unless the recent attack was a very mild one of brief duration, with little pyrexia or general disturbance, it is probable that he will. If it was a severe one, changes will probably take place in and around the appendix, resulting in a stricture, kinking, adhesions, etc., which predispose to a recurrence, and therefore operation is strongly indicated.

An exception may perhaps be made where the patient has had numerous fairly acute attacks of appendicitis, perhaps six or seven, and each has been less severe than the preceding one. If these cases are operated upon, it is usual to find the appendix partially destroyed, great fibrous thickening of the submucous coat, and the lumen closed or entirely obliterated for a great part of its extent. Adhesions are commonly met with which shut off the appendix more or less completely from the surrounding peritoneal cavity. A patient with an appendix in this condition is unlikely to have a very serious attack, and therefore, if strongly opposed to operation, he may be treated on medical lines. At the same time one must bear in mind the pathological conditions in the upper abdomen which are frequently associated with, and apparently caused by, chronic inflammation of the appendix. If there are symptoms of dyspepsia the appendix should certainly be removed, lest worse befall.

Recurrence of Symptoms after Appendicectomy.—Sir Frederick Treves went fully into this question in 1905, and made a valuable contribution to the subject by analyzing the cases of 45 patients who consulted him because they were no better for the operation, or still had "attacks" which had been unaffected by the removal of the appendix. In the following table he gave a list of the patients who consulted him, and the varying conditions which gave rise to their symptoms.

Table E. PATIENTS WHO COMPLAINED OF IMPERFECT RELIEF AFTER THE REMOVAL OF THE APPENDIX IN THE QUIESCENT PERIOD.

Appendix imperfectly removed	2
Ovarian trouble coexisting	9
Persisting or relapsing colitis	8
Persisting local pain	7
Neurasthenia or hypochondriasis	5
Continued attacks due to adhesions	4
" " cold	2
" " movable kidney	2
" " stone in kidney	1
" " an unexplained cause	
Tender mass in the right iliac fossa	5
	45

Reference to this table shows that in a large proportion of the cases the symptoms were not caused by appendicitis, but by various other conditions such as gall-stones, colitis, etc., and consequently the failure of the operation was due to an incorrect diagnosis.

In 9 cases the stump of the appendix had not been removed, and the patient had further attacks in the stump which was left.

[illegible]

[illegible]

[illegible] removed [illegible] the appendix [illegible] and [illegible] during the [illegible] stage.

At the present time [illegible] the usual practice, when operating upon an abscess, to remove the appendix [illegible] but at one time it was the rule to be content with opening the abscess and not to remove the appendix unless it actually presented itself during the operation.

[illegible]

Further [illegible] the appendix had not been removed [illegible]

Hoffmann reported that out of 78 cases of appendix abscess 44 [illegible] subsequently [illegible] and that in a certain proportion there were further attacks of appendicitis.

An interesting paper was published by [illegible] in 1912. He recorded 17 cases of appendicitis with abscess formation in which the appendix was removed when the attack had subsided. In none of these cases was the appendix destroyed [illegible] but in all of them there were adhesions, kinks, and scars, which of course [illegible] exposed to further attacks.

Sex.—It has long been recognized that the male sex is more liable to attacks of appendicitis than the female, and numerous statistics have been published to illustrate the incidence of appendicitis in the two sexes. In the 1905 series I found that of the 1000 cases 682 were males and 318 females, the males forming 68.2 per cent. of the total. Of the 898 cases which were operated upon in the London Hospital in 1912, 515 were males and 383 females, a percentage of 57.3. Added together, in 1898 cases there were 1197 males, that is, 63.1

per cent. This agrees closely with the result obtained by MacCarty, who compiled 2,586 cases reported by four different workers, of which 61.7 per cent were male.

In order to obtain a larger number, I collected all the cases admitted to the London Hospital during the years 1901–1912. I found that there were 3652 males and 2426 females, a total of 6078. This means that the male patients formed almost exactly 60 per cent of the cases, and somewhat remarkably, with the investigations to be found later in the Jubilee Hospital, I found the proportion of men to women was as 60 to 40.

The proportion of the male sex is not limited to adults only, the same holds good in the case of children. In 1912 99 children were admitted to the London Hospital suffering from appendicitis: 61 were boys and 38 girls, a male percentage of 61.6.

Why the male sex should be more subject to appendicitis than the female is not known, though numerous explanations have been offered, longer bowel in the male, or adult, and blood supply in the female sex through a branch of the ovarian artery. Greater exposure to injury and the exercise of a sedentary occupation in the male sex.

As to the severity of the attack, although men are more frequently subject to appendicitis, the attacks appear to be more serious in the female sex, and are attended by a higher mortality. For example, of the 515 men 14 died, of the 383 women, 16 died, giving a male mortality of 2.7 per cent, while the female mortality was 4.2 per cent. This suggests that although the male sex is more frequently affected, namely in the proportion of 6 to 4, the attacks are more serious and more frequently fatal in the female sex.

Age. The age at which appendicitis occurs varies within wide limits, although, as we shall see presently, there is a very definite period of life when the disease is especially common. In the present series the youngest patient was 10 months old, and the oldest 72 years, both recovered. The oldest patient, however, that I know of, was a gentleman of eighty-four upon whom I operated and from whom I removed a gangrenous appendix. He made an uneventful recovery. On referring to Table II. it will be seen that of 1000 cases 117 occurred in children up to the age of ten, 339 between eleven and twenty, and 275 between twenty-one and thirty. That is, 611, or 61.1 per cent, occurred between the ages of eleven and thirty, and 731, or 73.1 per cent, before the age of thirty-one.

As regards mortality, it has long been said that the mortality is especially great in the earlier and later periods of life, and it is interesting to see that the results obtained in the present series bear this out. Among 117 cases under eleven years of age there were 7 deaths, a mortality of 6.0 per cent. Between eleven and twenty there were 339 cases, with 9 deaths, a mortality of 2.7 per cent, and between twenty-one and thirty, 275 with 10 deaths, a mortality of 3.6 per cent. We next come to the period between thirty and fifty; here the results are very remarkable, as in 233 cases there were only 3

[illegible] giving the low mortality of 1·3 per cent. It is always dangerous to draw conclusions from statistics unless the figures are very large and all causes of error have been excluded as far as possible; one cannot help feeling it is very suggestive that out of 263 cases there should only be a mortality of 1·5 per cent.

Table V.—Mortality of Appendicitis at Different Ages.

	R	D	R	D	R	D	R	D	R	D	R	D	[illegible]
[illegible]	12	0	40	0	13	3	33	0	12	4	110	7	[illegible]
[illegible] 29	78	1	107	1	55	0	59	2	31	5	330	9	[illegible]
[illegible] 40	103	0	76	0	27	2	51	4	8	4	265	10	[illegible]
[illegible] 50	66	1	42	0	15	0	29	0	7	0	159	1	[illegible]
[illegible] 60	28	0	14	0	5	0	21	1	3	1	71	2	[illegible]
Over 50	13	0	4	0	2	1	11	0	3	2	33	3	[illegible]
[illegible]	300	2	283	1	117	6	204	7	64	16	968	32	[illegible]

Over the age of fifty, the numbers are so small as to be of little value. There were 36 patients, 3 of whom died, giving a mortality of 8·3 per cent. One is not surprised to find that the mortality in people of advanced years is greater than that in young people and those in the prime of life. It only stands to reason that a patient who is getting on in years, and is possibly troubled with some deficiency [illegible] pulmonary, cardiac, or renal organs, should be more likely to [illegible] respond to treatment, and should succumb from heart failure [illegible] pulmonary complications.

CHRONIC APPENDICITIS.

Chronic Appendicitis and Conditions associated with it.—So far I have dealt only with the prognosis in acute cases. Chronic appendicitis must also be considered, not only in relation to the possibility [illegible] acute attacks, but also in relation to other more remote [illegible]. The so-called appendix dyspepsia is now a well-recognized [illegible] entity, and of late the medical profession has realized the [illegible] with which chronic inflammation of the appendix is associated with important pathological conditions in the appendix [illegible].

Appendix Dyspepsia.—It is now generally recognized that chronic [illegible] of the appendix may give rise to symptoms simulating [illegible] the stomach or duodenum, [illegible] gall-stones; and a definite diagnosis between these various conditions can be made in the great

majority of the patients, if the case is properly investigated and a full account of the symptoms obtained and carefully considered. The writings of Paterson and Chapman should be consulted, particularly the article by the latter in the *British Medical Journal*, January 29th, 1910, and the paper on "Appendix Dyspepsia" [illegible] *The Surgery of the Stomach*. [illegible] on the principal features of the condition. The most frequent complaint is [illegible] in the epigastrium, [illegible] after food, sometimes immediately, at other times not until two hours or more [illegible]. It is frequently accompanied by flatulence and regurgitation. [illegible] the character of the food makes little difference. An important point of distinction between the [illegible] disease of the appendix and [illegible] [illegible] [illegible] Moynihan [illegible] [illegible] I have seen records of patients who complained of pain [illegible] [illegible] [illegible].

An interesting feature of these cases is the comparatively small number of patients who have had previous acute attacks of appendicitis, so that in many cases the patient has no reason to suppose that his appendix is at fault. Harold Barnard recently drew attention to this in an article in the *American Journal of Surgery*. In 41 cases he found only 5 with a history of previous attacks.

Sherren divides cases of appendix dyspepsia into two groups. In the first he places patients operated upon for intractable indigestion, in whom, after the upper abdominal organs had been explored, the appendix was removed. In this group there were no localized symptoms or physical signs indicating disease of the appendix. In the second, he places patients operated upon for attacks of abdominal pain characteristic of or due to the appendix, in whom there was a history of long-continued indigestion. The condition of these cases twelve months or more after operation was as follows:—In the first group, out of 52 cases 36 were absolutely well, 6 were well and complained only of a little flatulence at times, 2 were better, and in 8 there was no improvement. In the second group, out of 42 cases, 36 were cured, 3 much improved, and in 3 there was no improvement.

Gastric and Duodenal Ulcer.—It would appear that appendix dyspepsia is a preliminary stage only, and if it is neglected, gastric

[illegible]

[illegible] Dixon [illegible] appendicitis [illegible] Mayo [illegible] 64 per cent of [illegible] appendicitis [illegible] Patterson [illegible] appendicitis [illegible] 60 per cent. Moynihan [illegible] 11 cases of chronic appendicitis [illegible] 12 and at 80 per cent found evidence of [illegible] McCarty and McGrath report that in 52 operations [illegible] 29·9 per cent of the appendices [illegible] partially or completely obliterated. In a recent report [illegible] exception to find a normal appendix in the presence of a [illegible] or chronic ulcer.

Conclusions. These two apparently [illegible] are [illegible] In several cases where the symptoms have been [illegible] chronic ulcer, I have found adhesions round the [illegible] [illegible] of the numerous residuals and a [illegible] appendix. Here again, McCarty and McGrath have [illegible] interesting statistics. In 57 autopsies in cases of [illegible] the appendix was partially or completely obliterated in 52 per cent. They further draw attention to the fact that of 365 cases of [illegible] in 29·2 per cent the symptoms began at or under 25 years [illegible] such appendicitis is extremely common, and in 13 per cent there was a history of pain and tenderness in the appendix [illegible] appendices were only removed in 59 of the above cases, but 60 per cent of these appendices showed undoubted signs of disease. They [illegible] that the sequence of events is [illegible] [illegible] discoloration, and finally, [illegible]

It is now generally recognised that the appendix may [illegible] an abnormal part in diseases of the upper abdomen, and that its [illegible] of mucoid ulcer, cholecystitis, [illegible] and peri-hepatitis, is complete without extirpation of the appendix and its [illegible] removed.

The explanations are not quite clear, though there are numerous [illegible] Bayer and Mayo[illegible] thinks that a gastric ulcer may be caused [illegible] from the inflammation in the appendix and its secondary [illegible] explanation is that there begins a vicious circle, thus: [illegible] causes [illegible] adhesions and kinking of the intestine, the [illegible] stasis, backing up the small intestine to the stomach and duodenum. This may be so, and the propounder of this theory, Sir Arbuthnot Lane, has explained the disappearance of the gastric or duodenal

[illegible]

ARSENIC POISONING. In the antidotes of poisonous by arsenic [illegible] depends on whether the poisonous [illegible] In the

ARTERIAL TENSION, HIGH.

The Height of the Pressure

[illegible] that the mortality [illegible] systolic pressure [illegible] 150 mm. [illegible] was 35 per cent [illegible] of persons whose pressure was 170 or over was [illegible] less than four times [illegible] as that of the average man. [illegible]

Mortality According to [illegible]

Below 120	[illegible]
120–140	[illegible]
141–160	[illegible]
161–180	[illegible]
181–200	[illegible]
Over 200	[illegible]

[illegible] figures suggest that pressures up to 160 [illegible] but that after that the [illegible] as the figure rises.

In assessing the importance of the [illegible] pressure [illegible]

[illegible]

2. **The Cause or Causes.** [illegible]

The General Symptoms.

ARTERIES, WOUNDS OF.

ARTERIOSCLEROSIS

General Outlook

[illegible]

[illegible]

1. **Etiological Factors.** [illegible]

[illegible]

who made a collective enquiry into the incidence of arteriosclerosis in Austria and found that the disease was [illegible] even in districts where the women smoke pipes and the habit begins in childhood. It is at any rate [illegible] to suggest a good [illegible] from cessation or moderation of smoking, where the habit has been [illegible] and no other factor is detected to explain it. This [illegible] of considerable interest.

Passing from these [illegible] to those [illegible] high repute. Among these [illegible] Cheyne's [illegible] that the [illegible] of [illegible] and the [illegible] [illegible] [illegible]

[illegible]

2. **Stage of Development.** [illegible]

[illegible] are to be interpreted [illegible] progressive arteriosclerosis [illegible] when they are associated with palpable thickening of the [illegible] [illegible], and, as such, they add to the gravity of the prognosis, for [illegible] they that the disease is [illegible] [illegible] to [illegible] proper nutrition of the organs and tissues of the body.

Summing up what has been said as to the significance of the [illegible] [illegible] [illegible] [illegible] that [illegible] [illegible] [illegible] towards the point at which the [illegible] blood supply from [illegible] parts of the body, and that we ought [illegible] [illegible] [illegible] of the earliest phases of this [illegible] [illegible].

Distribution.—One other aspect of the disease must be taken [illegible] in weighing up the prognosis of any [illegible] [illegible] [illegible] of the [illegible] [illegible]. It is obvious that there [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]. Although [illegible] [illegible] [illegible] [illegible] [illegible] to accompany [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]. The cardiac lesions are [illegible] [illegible] [illegible] [illegible] to life. [illegible] [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the disease [illegible] [illegible] [illegible] [illegible] [illegible] such as [illegible] [illegible].

[illegible] [illegible] [illegible] that a [illegible] [illegible] [illegible] part of the body predisposes to the occurrence of [illegible]. The [illegible] example of this association is seen in the cerebral [illegible] which are apt to follow [illegible] [illegible] [illegible] [illegible] disease. **Rest in bed** [illegible] the heart through, but the [illegible] [illegible] impaired.

Summary.—In any individual case of arteriosclerosis the factors to [illegible] considered are: (1) The patient's [illegible] [illegible]; (2) The [illegible] of toxic or stress causes and the possibility of their removal; (3) The stage of the disease; (4) Its distribution.

[illegible]

ARTHRITIS DEFORMANS.—We shall consider separately the [illegible] [illegible] (I) Rheumatoid Arthritis; (II) Osteo-arthritis.

I. Rheumatoid Arthritis.

The [illegible] of rheumatoid arthritis must be made at present on [illegible] [illegible] general lines, for we have to realize that a considerable [illegible] in the **attitude toward the** nature of the condition has taken [illegible] [illegible] recent **years.** There is a general feeling that some infective [illegible] is the **exciting cause** of the condition, or, what is probably [illegible], **that a variety** of infective processes are concerned. [illegible] [illegible] [illegible] much emphasis upon the infection and, [illegible] the **point of view** of investigation, this attitude seems to offer

[illegible]

[illegible]

[illegible]

Predisposing Causes. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

The Influence of Treatment upon Arthritis Deformans

[illegible]

ARTHRITIS, SEPTIC. — (See [illegible])

ARTHRITIS, TUBERCULOUS. We [illegible] other general considerations in the pathology of tuberculous joint disease and their treatment, the reader will find the various particulars of treatment in particular cases.

General Outlook. The following f[illegible]s are of great importance in arriving at an accurate prognosis: the [illegible] of the patient; the presence of [illegible] tuberculosis; the general physique and careful [illegible] of patients.

With regard to the age, we have [illegible] cases, these children usually [illegible] from [illegible] cases where the disease is [illegible] in the joint.

Concerning the general and local propositions, no comment is needed [illegible] do not [illegible] under the [illegible] of the disease. Abdominal disease is now [illegible].

The [illegible] is that of [illegible] tuberculosis, and the [illegible] of the [illegible] be regarded as a warning [illegible].

In [illegible] cases, [illegible] is [illegible] is the exception and not the rule. In general [illegible] especially if [illegible]. Further, tuberculous hip leads, in many cases, to [illegible] of the case.

Although the majority of patients with a tuberculous joint eventually [illegible] with, where the [illegible]. Even when there is no pain, swelling or other [illegible] that the bacilli are all dead. Strain, pregnancy or lactation, forcible bending of the joint by a [illegible] [illegible] of the [illegible].

Hip-joint.—A few years ago, the eventual mortality of this disease was put at 50 per cent., but nowadays it is undoubtedly less. Watson Cheyne found a death-rate of 12 per cent in 77 cases, but some of the patients had phthisis; excluding these, the fatalities amounted to 8 per cent. No cases were fatal which were aseptic throughout.

The duration of treatment must be long. Thomas used to estimate [illegible] with his splint; Cheyne considers this [illegible]. The amount of shortening is usually about one and a half inches; [illegible] pounds of [illegible] the disease can be brought to a standstill, there will be no permanent shortening in [illegible] cases.

The prognosis in relation to treatment is very important. Some [illegible] at a recent debate of the Royal Society of

[illegible] that tuberculous [illegible] Bath's Home reported 10 cases [illegible] by [illegible] Mayo and Smith quoted 19 of whom 16 were pronounced [illegible] badly, while [illegible] improved or cured.

There is no doubt that [illegible] prolonged early treatment [illegible] the numerous reports of [illegible] were concerned with [illegible] cases at the New York Cancer Hospital 107 were [illegible] 15% of moderately advanced [illegible] Alexandra Hospital, London, 900 cases were treated [illegible] and only 1 died. Bradley Gayton recorded [illegible] without operation at the Albany Hospital [illegible] results, of 335 cases of tuberculosis of various parts [illegible]

Of course, it is not possible to obtain results as good as these [illegible] measures in ordinary hospital practice. But [illegible] surgeons are disposed to regard [illegible] with [illegible] time, except, perhaps, in adults.

Since one of the principal supports [illegible] the [illegible] results in the following table.

Results of Excision for [illegible]

[illegible]	60	19	4	3	3	12	19
[illegible]	64	24	5	1	12	1	18
[illegible]	54	10	15	1	1	6	21
[illegible]	29	9	4	1	6	2	6
Total	207	62	28	6	22	21	64

It will be seen that the death rate [illegible] and [illegible] of the fatalities were due to generalized tuberculosis. Sinuses were most [illegible] children. The average shortening was [illegible] and 11 [illegible] inches; the maximum was [illegible] and a half inches. Of the [illegible] followed through, 23 out of 40 [illegible] of [illegible] limb.

Tuttle gives results of 10 cases operated on at Great [illegible] Hospital between 1896 and 1903. Eventually 6 of these died and 8 required amputation, so that 35 per cent were a failure. In 11 cases sinuses were still present. In 15 the disease had become inactive. Deformity was rarely noticed but atrophy [illegible] there were 13 fixed joints, 10 [illegible] and 1 shortened. Seven were earning full wages.

We may conclude, therefore, that after excision a good result [illegible] be obtained in only about half the cases.

There is again a very real danger of lighting up fatal acute tuberculosis. Death took place from this cause, soon after the

knee joint

Ankle and Foot. [illegible]

Shoulder-joint. [illegible] According to [illegible]

Elbow joint. [illegible] According to figures quoted by Watson Cheyne, 75 per cent [illegible] have a stiff or a flail joint in about equal proportions. [illegible] the elbow 54 times: 6 patients died subsequently [illegible] (two and a half years) of generalized tuberculosis. [illegible] these, 25 out of 27 obtained a "good" or "useful" joint, [illegible] there was considerable power and mobility, in 6 ankylosis, and [illegible] flail. The shortening averaged one and a half inches. Only [illegible] required subsequent amputation.

Wrist-joint. [illegible]

Dactylitis. [illegible]

Sacro-iliac Disease. [illegible]

[illegible]

ASCITES. [illegible] Tuberculosis [illegible]

[illegible]

[illegible]

Medical Treatment. [illegible]

[illegible] consisting of 800 c.c. of milk only, given in equal quantities [illegible] has given good result. Gaudmann. [illegible] Though besides removing fluid it may exert a [illegible] especially in cirrhosis. Excessive purgation may [illegible] impair nutrition, and in the past many aqueous treatment [illegible] hastened the end. When ascites disappears as the result [illegible] administration of potides, the underlying cause is almost certainly [illegible] and the prognosis is therefore very good.

Operative Treatment.—In ascites associated with innocent ovarian [illegible] tumours, operation renders the outlook extremely good [illegible] association is not very frequent. Ascites was found in 10 [illegible] per cent. of 20 cases of ovarian fibroma, in 31, or 7·9 per cent [illegible] of multilocular ovarian cysts, and in 55, or 7 per cent, of 723 [illegible] fibromyomas (Cabot[1]). In papilloma of the ovary ascites is [illegible] In all these conditions removal of the tumour cures the ascites, and Cabot[1] points out that it may also cure a concomitant [illegible] effusion.

[illegible]

[illegible] In some cases of fatal cirrhosis ascites does not require tapping. The prognosis, however, is not necessarily bad because tapping is not required, for in tuberculous peritonitis it would be called for, and in syphilitic disease of the liver, antisyphilitic treatment may be followed

In Individual Cases. [illegible]

Physical Characters of the Ascitic Fluid. [illegible] ascitic fluid in conditions, such as hepatic cirrhosis, backward [illegible] heart disease, and occasionally malignant growth, in [illegible] the outlook is grave, and also in tuberculous peritonitis, in [illegible] the prognosis is comparatively good. In cirrhosis there is often [illegible] but due to fluid, and this may also occur in cardiac disease.

Prognosis from Cytological Data

[illegible]

[illegible]

[illegible]

[illegible]

ASTHMA, BRONCHIAL.

although it may extend over several years. The use of intranasal remedies, such as dilute preparations of cocaine, often give relief for similar reasons, but they seldom if ever produce a permanent cure. At one time it was thought that the removal of gross abnormalities in the nose of asthmatic patients would be attended with excellent results. These expectations have not been confirmed, and it is doubtful whether success is obtained in more than five per cent of these operations, whereas in a not inconsiderable number the asthmatic attacks are aggravated. Further, it is a curious thing that if a polypus is removed before the light cauterization treatment, the symptoms may become worse; whereas if the cauterization of the septal nerve precedes the removal of the polypus, good results may be obtained.

As a further argument of the importance of ascertaining the cause in each case, it should be mentioned that if the disorder appears to be associated intimately with gout, high blood pressure, chronic constipation, or other pathological condition, appropriate treatment directed against the cause may do much to lessen the frequency of the attacks, although it seldom produces a lasting cure.

In all well-established cases, we have to take the question of the family history into account in estimating the prognosis, but in every case the most important factors are the amount of emphysema, the degree of bronchial catarrh, and the condition of the right heart. These complications all increase the tendency to asthmatic attacks, which in turn increase the severity of the complications, and so the patient lives in a vicious circle. By the relief of complications much can be done to prolong life. The introduction of appropriate [illegible] treatment for bronchitis has helped to prolong the life of many asthmatics. In a number of instances considerable relief of the bronchial catarrh has been obtained, together with an increased immunity against particular organisms; hence longer intervals occur between the attacks of bronchitis, and consequently there is greater freedom from the paroxysms. Again, the use of 'pressure baths' for the treatment of emphysema has given considerable relief, and hence a longer life in some cases. In fact, it may be stated with some confidence that modern methods of treatment have tended, by the removal of the initial cause, or by the relief of serious complications, to do much to improve the general prognosis in persons suffering from asthma.

It may be of interest to add that a person who suffers from asthma seldom develops tuberculosis, cancer, or Bright's disease.

[illegible] Latham.

ATAXIAS.

Tabetic Ataxia. As indicated elsewhere (see TABES DORSALIS), ataxia is a relatively late symptom of tabes, and in a large proportion of tabetic cases, if the malady be recognized in the early stages, ataxia need never develop at all. The symptom is best prevented by careful avoidance of physical over-exertion, and by systematic

[illegible] of the limbs, always stopping short of any sensation of [illegible].

Once ataxia has supervened, its intensity is proportional to the [illegible] hypotonia, and to the degree of impairment of joint sense [illegible] kinæsthetic sense.

The prospects of alleviation or cure of tabetic ataxia vary widely in different cases. The occurrence of optic atrophy seems to have a mitigating effect upon its incidence; this, however, only applies to cases of moderate ataxia in which optic atrophy supervenes relatively [illegible] the course of the disease. In some tabetic cases where ataxia [illegible] developed with great rapidity, rest in bed for a few weeks or months [illegible] markedly beneficial effect; and the patient, previously unable [illegible] without support, may spontaneously regain to a large extent [illegible] powers of progression. In other cases again, where the ataxia has [illegible] and steadily getting worse, an acute intercurrent illness, [illegible] the patient to bed, may rapidly aggravate all the symptoms, [illegible] he may pass from the ataxic to the so-called paralytic or helpless stage. In the majority of cases, however, the ataxia is slowly and gradually progressive. What is the prospect of improvement in this class of tabetic patients? Carefully devised exercises, under skilled supervision, can generally improve the ataxic symptoms, the amount [illegible] improvement being dependent on the intelligence of the patient [illegible] the patience and ingenuity of the physician. It is not [illegible] for a previously bedridden patient thus to regain the power of standing or even walking, with or without support. Or a patient [illegible] the gait is moderately ataxic may, as a result of these exercises, [illegible] confidence to such a degree that he succeeds in correcting and [illegible] his ataxia, so as no longer to be an object of remark to the unskilled observer. Real cure of ataxia does not occur, but the acquisition of new modes of movement has a compensatory effect, and may to a large extent conceal the old ataxia.

Family and Hereditary Ataxia.—Whether this be the type known [illegible] Friedreich's, Marie's cerebellar type, or the intermediate spino-cerebellar variety, the ataxia has a slow and insidious onset in childhood [illegible] adolescence, the legs being affected earlier and more severely [illegible]. The degenerative process being essentially progressive, [illegible] is unfavourable as regards relief of the ataxia, and it is [illegible] attempt re-educative exercises. The malady itself does not [illegible] shorten life, and the patient may survive for many years, even when helplessly ataxic. The prognosis as to life depends upon [illegible] with which the patient is nursed and looked after, and [illegible] with which intercurrent maladies can be avoided.

Ataxia due to Focal Lesions of the Cerebellum.—This may be [illegible] (as in thrombosis or hæmorrhage), or inflammatory (as in abscess, acute encephalitis, or localized meningitis), or associated [illegible] tumour. In such cases, the prognosis of the ataxia depends on whether the underlying cerebellar disease can be removed by surgical or medicinal means. If so, the ataxia may entirely

disappear, even in cases where a considerable amount of cerebellar tissue has been permanently destroyed.

Ataxia due to Focal Lesions elsewhere in the Brain.—In cases where ataxia is one of the symptoms of focal disease in other parts of the brain—e.g., in the corpora quadrigemina, optic thalami, crura cerebri, etc.—the prognosis is, as a rule, unfavourable; since, even if the lesion happens to be a stationary one, compensatory action by other parts of the brain does not, as a rule, occur. *Purves Stewart.*

ATROPHY, MUSCULAR. (*See* Muscular Atrophies.)

BERI-BERI. The mortality of beri-beri varies considerably in different countries. According to Castellani it is 2·5 to 3·5 per cent in Japan, 2 to 6 in Java, 19·7 in the Malay States, 48·6 in Hong-Kong, and 60 to 70 per cent in Sumatra. It is mainly dependent on the proportion of the wet or dropsical type, in which the death-rate is far higher than in the dry or paralytic variety. The great cause of death is sudden heart failure, especially seen in patients not kept in a strictly recumbent position during the acute stage, and in malignant cases it may carry off the patient in from a few hours to a few days. Even after apparent recovery, attacks of palpitation may continue to occur for a long time and even prove fatal.

Bad prognostic signs are extensive dropsy, especially with œdema of the lungs or hydropericardium, cardiac oppression, palpitation, dyspnœa, great increase in the pulse-rate on slight exertion, and vomiting.

The dry form of beri-beri is seldom fatal, but may leave deformities due to permanent paralysis of some of the muscles.

An infantile form of beri-beri has been described in the Philippines by Chamberlain and Vedder, which they state accounts for 56 per cent of the total infant mortality.

Extract from rice polishings is very effective in infantile beri-beri, and to a less extent in the adult forms. Complete and prolonged rest in bed is the most important factor in reducing the mortality of the dangerous wet form. Recent discoveries relating to the dietetic origin of the disease have enabled it to be eradicated from among the Philippine scouts, and in gaols, asylums, etc., by attention to diet alone. *Leonard Rogers.*

BILHARZIASIS.—The urinary and rectal diseases produced by the bilharzia, although very distressing, have a low mortality, chiefly due to tertiary septic infection of the bladder and ulceration of the rectum. If the patient is removed from the endemic area of the disease before it is too advanced, the ova generally cease to be passed within three years, and recovery takes place. *Leonard Rogers.*

BLACKWATER FEVER.—Most authorities with much actual experience of the disease in the tropics look on blackwater fever as a complication of malaria, chiefly prevalent in intensely malarious

[illegible] of Africa and India, as shown by Stephens and Christophers. [illegible] mortality is variously estimated by different authorities, varying [illegible] 4 to 6·8 per cent by the Plehns, 21 by Koch, and 23 to 24 by [illegible]enger-Féraud, up to as much as 50 per cent.

The severity in individual cases varies within wide limits, from a [illegible]ght temporary hæmoglobinuria with little constitutional disturb[illegible] to very extensive blood destruction followed by blocking of the [illegible]al tubules with hæmoglobin and fatal suppression of urine. Nearly [illegible] fifths of the mortality, according to Daniels, is due to this kidney [illegible]. Great diminution or absence of urine is the most serious [illegible]ptom, which will prove fatal if it lasts for two days, even [illegible]psulization of the kidneys having failed to save such patients. [illegible] grave symptoms are severe anæmia from rapid destruction of [illegible] blood, persistent vomiting and hiccough, diarrhœa, continuance [illegible]h fever, cerebral symptoms, and low-tension pulse. Relapses of [illegible]al nature may occur in patients who have recovered from one [illegible] more attacks. Measures to increase the urinary flow, including [illegible]ne and alkaline injections, do most to lessen the mortality. The [illegible] of Christophers and Bentley in the Duars in India showed that [illegible]stent prophylactic use of quinine in this very malarious district [illegible]tly diminished the occurrence of the disease, thus confirming its [illegible]rial origin.

Leonard R[illegible]

BLADDER, CALCULUS OF. A stone may form in the bladder [illegible] may descend into the bladder from the kidney. A stone which [illegible] in the bladder is likely to remain there until removed by oper[illegible]. On the other hand, a stone which passes into the bladder from [illegible]reter will, in a large proportion of cases (70 to 80 per cent), pass [illegible] by the urethra in the course of a few hours or a few days. The [illegible] of urethral obstruction, such as enlarged prostate, or of atony [illegible] bladder, as in tabes, or of a diverticulum of the bladder, will [illegible] the expulsion of the calculus, which remains and develops in [illegible] bladder.

Stone in the bladder is a painful malady, and it is seldom that [illegible] case is allowed to run its course without an attempt at relief [illegible]ation. There are, however, cases where the symptoms are [illegible]ely slight, so that the patient either disregards them, or [illegible] that a stone is present, prefers the pain or discomfort to [illegible] risk of operative interference. Such stones may remain in the [illegible] fifteen or twenty years, or even longer, and reach a great [illegible]. Eventually, however, and usually at a much shorter period than [illegible] unrelieved vesical calculus causes death, either by ascending [illegible]ritis, or by back pressure causing dilatation of the kidney [illegible]stual nephritis, or by a combination of the two. In the [illegible]ty of cases an operation is performed, and the prognosis [illegible]lus lies in the success or failure of the operative measures [illegible].

[illegible] factors are important: (1) *The date of the op[illegible]*

(2) *The presence of sepsis;* (3) *The presence of bladder complications;* (4) *The presence of kidney complications;* (5) *The result of the operation.*

1. **The Date of Operation.**—When a small calculus is lodged in the bladder, its removal is a simple matter, and the danger to which the patient is exposed is very slight. The operation can be performed under local anæsthesia, so that the small danger of a general anæsthetic is avoided.

An evacuating cannula and bulb may suffice to remove the calculus from the bladder, or the use of a small lithotrite may be necessary. There should be no mortality for such an operation.

At a later stage, the size, number, and density of the stones, the presence of sepsis and of other complications, render the outlook for operation more serious. In the advanced stage, when the kidneys are diseased, operation of whatever kind is a serious undertaking, and is attended by a considerable mortality.

2. **The Presence of Sepsis.** There are two classes of cases. In one, an aseptic calculus becomes infected either spontaneously or after the passage of instruments; in the second, the calculus develops in a bladder already infected.

The majority of calculi in the first class are composed mainly of oxalate of lime or uric acid, and they increase very slowly in size or number. When the urine becomes infected, and especially when the reaction of the urine becomes alkaline, a rapid increase in size takes place from the deposit of phosphates on the surface of the stone. Phosphatic calculi formed in an infected bladder develop very rapidly: a calculus of considerable size developing in a few weeks.

Sepsis affects the prognosis in two ways. The mortality of operations on infected stones greatly exceeds that of operations on aseptic stones; and secondly, the probability of recurrence after operation is much greater.

3. **Bladder Complications.**—A healthy bladder, or one with a moderate degree of cystitis, will permit of an easily performed and complete lithotripsy, the mortality of which is very low and the probability of recurrence is slight. When severe cystitis is present, and the bladder is acutely spasmodic, lithotripsy becomes difficult and may be impossible, and lithotomy becomes necessary, with a higher mortality.

When the bladder is sacculated, or when a diverticulum is present, lithotripsy should not be performed, and suprapubic lithotomy is necessary. In such cases sepsis is always present, and it is difficult and frequently impossible to get rid of the infection. The prognosis is grave, for recurrence of the stone is probable, and ascending pyelonephritis may supervene. When a solitary diverticulum of large size is present, an operation for the removal of this will be necessary.

New growths of the bladder occasionally complicate calculus. In such cases the prognosis depends upon the nature of the growth and upon the ability of the surgeon to diagnose its presence before attempting lithotripsy.

Bilharzial disease of the bladder is a grave complication of stone met with in countries where bilharziasis is rife. Septic complications are common, and fistulæ follow cutting operations with great frequency. Perineal lithotomy is the operation usually chosen by those experienced in such cases.

Enlargement of the prostate complicates vesical calculus by increasing the probability of renal complications, and if the obstruction is left untreated, by favouring recurrence of the stone. Litholapaxy is possible when there is a moderate enlargement of the prostate; but it is unsafe, and may be mechanically impossible, when the enlargement is pronounced. The proper treatment of stone in the bladder with enlarged prostate is suprapubic prostatectomy with removal of the calculus.

4. **Kidney Complications.**—Infection of the kidneys is the most serious complication of vesical calculus, and is the commonest cause of death after operation, or when no operation has been performed. The infection takes the form of a pyelitis in milder cases, and a pyelonephritis in the more severe.

Stone in the kidney is a not infrequent complication. In many of these cases the stone in the bladder has developed on a small calculus passed from the kidney. In other cases the bladder is the seat of chronic cystitis from repeated descending infection from the kidney, and the vesical calculus forms in the infected bladder. Kidney symptoms may be absent or insignificant, and the presence of renal calculus and infection is very frequently overlooked. The prognosis in such cases is grave. An operation upon the kidney is required, in addition to that on the bladder, and nephrectomy may be necessary.

In such a case the presence of cystitis, if this cannot be cured, is a menace to the remaining kidney, from ascending infection.

5. **The Results of Operation.**—The operation chosen, and the results of operation, depend upon the factors which have already been considered above. Litholapaxy is the operation of choice. Suprapubic lithotomy is performed when there are bladder complications, such as sacculation, diverticula, bladder spasm, enlargement of the prostate, [illegible] cystitis, new growth of the bladder; when the size and [illegible] of the stone make crushing impossible; or when septic renal complications render bladder drainage advisable.

Perineal lithotomy is reserved for special cases, such as those with stricture of the urethra complicating vesical calculus, and also for cases of [illegible].

The mortality statistics of litholapaxy are much lower than those of [illegible], but they hardly give a fair index of the relative gravity of the two operations; for many surgeons reserve lithotomy for the more serious complicated cases, while performing litholapaxy in all [illegible].

Statistics collected by Keegan of stone operations in India show that the mortality in 10,073 litholapaxies was 3·96 per cent; in 7201 cases of lateral lithotomy it was 11·02 per cent, and in 147 cases of

[illegible] per cent. In the Indore Charitable Hospital, Central India, in the period 1881 to 1900, there were 500 [illegible] 11 deaths = mortality of 2·2 per cent.; and [illegible]

The [illegible] 1960 stone operations [illegible] at St. Peter's Hospital from 1864 to 1916.

[illegible] Operation for Stone in the Bladder.

St. Peter's Hospital, 1864–1914.

[illegible]	118	100	18	15·25
[illegible]	196	166	30	15·30
[illegible]	362	332	30	8·29
[illegible]	600	571	29	4·80
[illegible]	578	[illegible]	19	3·28
[illegible]	106	102	4	3·92

[illegible] surgeons is as [illegible] per cent.; v. Frisch, [illegible] 2·61 per cent. Watson [illegible] 17,750 cases of lithotapaxy, with 426 [illegible] 2·4 per cent. The influence of age upon the [illegible] Between one and fifteen [illegible] 2,518 cases, with a mortality of 1·7 per cent.; between [illegible] 719 cases, with a mortality of 1·6 per cent.; over [illegible] 4·4 per cent.

[illegible] Zuckerkandl, [illegible] Barling, 17·8 per cent.; Dittel, [illegible] per cent.; Guyon, 24·3 per cent.; [illegible] Watson collected [illegible]

The high mortality of suprapubic lithotomy, compared with litho- [illegible] cases were treated by [illegible] treated by one or other [illegible] Thus Assenfeldt, in [illegible] 3·6 per cent.

[illegible] Watson found 19 per cent. of recurrence [illegible] Zuckerkandl found 12 per [illegible] in recurrence [illegible] in the hands [illegible] immediately [illegible] provides [illegible] unimproved [illegible] foundations of

[illegible]sphatic stone, usually in the subjects of enlarged prostate. Recur[illegible] of oxalate-of-lime or of uric-acid calculi is much less frequent, but [illegible] occur from the descent of calculi from the kidney, or from new [illegible]ation in the bladder. The latter is very rarely the result of fra[illegible] left behind at a crushing or cutting operation. The recurrent [illegible] after removal of a uric-acid or oxalate-of-lime calculus, may [illegible]phatic, and is due to changes in the urine.

The effect of removal of an enlarged prostate upon the recurrence of [illegible]li varies according to their composition and the state of the urine [illegible] acid and oxalate-of-lime calculi rarely recur; phosphatic calculi [illegible]. *J. W. Thomson Walker.*

BLADDER, EXSTROPHY OF. There is some variation in the [illegible]ree of extroversion of the bladder. In the common form the [illegible] wall of the bladder is deficient, so that the bladder mucous [illegible]brane is exposed and bulges above the rudimentary penis, and [illegible] is discharged on the surface from the uncovered ureteral [illegible]es. The conditions of existence are miserable in the extreme. [illegible] is continual escape of urine, saturating the clothes, and leading [illegible]ammation and excoriation of the skin of the thighs and buttocks. [illegible] child lives in a pungent atmosphere arising from decomposing [illegible] his life is a burden to himself and to those around him. [illegible]ated deformities such as hare-lip, cleft palate, and spina bifida [illegible] present, and contribute to a fatal issue in infancy or early [illegible].

Progressive dilatation of the ureters and kidneys occurs. Ascending [illegible] nephritis is the commonest complication, and is the usual cause [illegible]ath which takes place, as a rule, during childhood or youth. [illegible]ally the patients survive till adult life, and even attain old [illegible]. A malignant growth may develop in the exposed bladder.

The operations performed for extroversion of the bladder are [illegible]us, and their number is an indication of the poor results gener[illegible] obtained. The principal symptoms against which treatment is [illegible]ted are the incontinence of urine, the pain and discomfort, and [illegible] and by the success in abolishing these the value of the [illegible] operations may be measured. These operations will be con[illegible] in three groups, as follows:

1. **Autoplastic Repair of the Bladder.** The ingenuity of many [illegible] among whom are Roux, Sédillot, Billroth, Thiersch, Wood, [illegible] and Legard, has been devoted to closing the bladder by flaps [illegible] Pozzi, in addition, attempted to form a fibromuscular [illegible] of the reconstructed bladder, from the adjacent [illegible].

[illegible] mortality of these procedures is not great, but the [illegible] are [illegible] factory. There is frequently failure to obtain healing in even [illegible] carefully planned operation, and many secondary operations [illegible]. Occasionally the bladder is covered in at a single opera[illegible] the total gain in a successful operation of this nature is that

[illegible] protected. The incontinence of [illegible] the patient is enabled to wear a urinal, and thus [illegible]. The deformity however continues [illegible] develops in the partly recon[illegible].

2. **Suture of the Margins of the Bladder, with or without Previous Operation on the Pelvic Girdle.** A few surgeons (Gerard, [illegible]) have attempted to close the gap by dissecting and suturing the [illegible]. This operation has, however, been [illegible].

In order to allow of the approximation of the separated pubic bones, as [illegible] the bladder, Trendelenburg performed [illegible] articulations. The posterior ligaments [illegible] in these cases not suffice to allow the [illegible] contact, the other side is similarly treated, and [illegible] apparatus for three or four months, [illegible] to close the bladder. The operation is a [illegible] the wings of the pelvis [illegible] separated again after some time. On [illegible] have been obtained, and in three cases [illegible] patient was continent after the operation.

Estor states that continence has been obtained in 13 per cent of the [illegible]. Short of this the mucous mem[illegible] with resulting improvement in the [illegible].

3. **Deviation of the Course of the Urine.** The number of opera[illegible] that only a few of the most successfu[illegible].

Peters's Operation. Catheters are placed in the ureters, which are [illegible] of the vesical mucous membrane [illegible]. The bladder is excised, and the rectum exposed [illegible]. The ureters are passed through the rectal wall, [illegible] through the anus, without suture. The [illegible] several days. A disadvantage of this [illegible] lower ureters is destroyed. In 4 cases, Peters obtained 2 good results, with 1 failure, and 1 death [illegible]. Sherman collected 11 cases operated by this [illegible] 2 died of pyelonephritis.

Maydl's Operation. The bladder is excised, leaving an area at [illegible] ureters. The sigmoid colon is [illegible] the ureters orifices implanted [illegible] this by implantation into the [illegible].

[illegible] Maydl's operation varies from 5·5 per [illegible] 26·7 per cent (Katz, 57 cases). In [illegible] from the operation: 2 of [illegible] subsequently closed in every instance.

Surgeons are by no means unanimous in regard to the protective power of the ureteric orifices, thus implanted, against ascending infection. In experimental work on dogs, the mortality due to ascending pyelonephritis is very high. Clinically, some surgeons have recorded a high percentage of fatal cases from this cause. Pauchet, out of 4 cases, had 3 deaths from ascending infection, occurring after twelve, fourteen and fifteen months respectively. On the other hand, cases have been recorded where the patients were in good health some years after the operation. Thus, Resigotté records a case alive and well after [illegible] years, Frank 1 after four years, Maydl 2 after four and five years, Kraimer and von Eiselsberg each 1 after five years, Ewald 1 after [illegible] years, Estor 1 after seven years, Tulber 1 after seven years, Forgue 1 after eight years, Wolfler 1 after ten years, and Roux 2 after three [illegible] years respectively.

The presence of urine in the rectum does not appear to have caused irritation, and inflammation of the mucous membrane is very rare. After the operation continence is the rule. This may be established [illegible] or gradually develop. The rectum becomes dilated, and a considerable quantity of urine, which may be quite clear, is discharged voluntarily. Occasionally, from want of development of the perineal and anal muscles, continence is not established. This occurred in one case in Petersen's collection. The condition of the rectal sphincters should be carefully examined before embarking upon the operation.

Maydl's operation is the most successful of any of those performed for extroversion of the bladder, and is the only one in which a considerable proportion of cases shows continence, together with disappearance of pain and discomfort, and an absence of ascending infection.

Soubottine's Operation.—A rectovesical fistula is created, the rectum is opened along its posterior wall after removing the coccyx, and a broad vertical band of rectal wall, including the fistula, is raised from the anterior rectal wall, the edges being united so that a tube is formed, the orifice of which is within the anal sphincter. The gap in the anterior bladder wall is then closed.

On this operation Estor says that it is as efficient in obtaining continence as that of Maydl, and has the advantage of separating the urine from contact with fæcal matter. At the same time the operation is more complicated and may fail at some part. The infected bladder is retained, and may be a source of trouble from calculus or other cause. Further, damage is done to the anal sphincters, already weak in many cases. In creating the rectovesical fistula, the peritoneum may be opened and infected. Three cases operated on by Soubottine died of peritonitis. In the first 6 cases where the whole operation was performed at one sitting, 2 died; whereas, in 10 cases in which a more [illegible] operation in successive stages has been employed, all survived. The functional result has been very satisfactory in these 10 cases: in [illegible] there has been voluntary micturition five or six times in twenty-four hours, the urine has remained clear, and ascending infection has not occurred.

J. W. Thomson Walker.

BLADDER, GROWTHS OF.—[illegible]

Papilloma.—[illegible]

Obstruction of the outlet of the bladder occurs when numerous papillomata are clustered round the internal meatus, or when a single papilloma with a long pedicle acts as a ball-valve. In such cases the bladder is trabeculated and sacculated, and the ureters and pelves of the kidneys are dilated. Infection of the bladder is especially liable to occur in such cases, and death from uremia is a common result of injudicious instrumentation or of rashed operation.

Infection of the bladder in papilloma rarely takes place spontaneously, and in the papilloma differs from infiltrating growths of the bladder. The passage of an infected catheter or cystoscope is the usual cause. As already noted, it is specially liable to occur when obstruction is a feature of the case.

The prognosis in a case of infected papillomatous bladder is very grave, since the infection is difficult to overcome, and secondary cystitis is a frequent and very fatal sequela.

Infection accounts for a large proportion of deaths. It results from constant irritation and lesions, and from septic absorption, and the frequent recurrent hemorrhage.

The Results of Operation.—The best results of operation are obtained in early cases, when the growths are small, single, or in accessible situations, the bladder acute, and the kidneys healthy.

In order to operate in this early stage, it is absolutely necessary that a change in general practice should thoroughly grasp the significance of hematuria, the cardinal symptom of papilloma. Unfortunately, that the hematuria of vesical papilloma is unaccompanied by any other symptom, and that it is intermittent in character, at first, prolonged intervals between the attacks. As a consequence, the patient, and not unfrequently his medical attendant also, regard the disappearance of the hematuria as a cure, the patient complaint.

It cannot be too frequently or too strongly urged that an attack of hematuria, however transient, is a matter of grave significance, and the cause of the hematuria must be traced and a decision, the results, and that for this purpose, in the great majority of cases, cystoscopy is necessary. The absence in the urine of cellular elements, the earlier of the hematuria, and the absence or presence of casts from the kidneys or bladder, are insufficient data on which to diagnose, however delicate the clinical pathologist, report or opinion be.

The prognosis, as to recurrence and to malignant transformation of growth, becomes graver as the duration of the papilloma is prolonged.

Unknown, results of operation on papilloma of the bladder are quoted.

Vesical operations by means of the operation cystoscope have been done by some surgeons. Their use is limited to the most favorable cases of bladder papilloma, when the bladder is tolerant of vesical manipulation, and the papilloma is not too large or too

[illegible]

[illegible] found that of 17 cases [illegible] the growth recurred [illegible]

2. Malignant Growths. [illegible] malignant growths of the [illegible] certainly fatal [illegible]. There are a [illegible] have existed [illegible] years, and then a rapid [illegible] metastases, [illegible]. In such cases the total duration of [illegible] to ten years. The [illegible] of symptoms, which terminated [illegible] a half to two years.

Malignant growths of the bladder are, in their earlier stages, [illegible]. Spread to lymphatic [illegible] parts take place only in the later stages, and the prospect of cure by a well timed and properly [illegible] operation is, compared with malignant growths of other external organs, [illegible] good.

[illegible] smooth outlines the passage [illegible] the [illegible] operation.

The Nature of the Growth.—The different varieties of malignant [illegible] of the bladder wall or muscle is distinguishable [illegible] after operation. The most [illegible] of the [illegible] growths are the papillomatous [illegible] papillomata, [illegible] papillomata, and [illegible] the same time [illegible] malignancy. The papillomatous [illegible] growth [illegible]

[illegible] *Growth.*—Extension of a [illegible] extension is gauged by means of the [illegible] part of the bladder [illegible] by the cystoscope. [illegible] always more extensive than the [illegible] it is best gauged by the finger after [illegible] spread can only be estimated at [illegible] mural spread, and perivesical [illegible] case unsuitable for partial resection of the [illegible] adversely the prognosis.

[illegible] *Growth.*—A growth situated at or near [illegible] bladder is in the ideal position for resection. As the [illegible] growth, in different cases, approaches the base, it becomes [illegible] for resection. The reason for this is not due to [illegible] growths at the lower part of the bladder [illegible] to the ureters, the trigone, prostate, and urethra [illegible] of the lower part of the tumour can be obtained [illegible] does not allow himself to be hampered by an attempt [illegible] or trigone, the middle and even the lower part [illegible] still suitable for resection; the lower part of the [illegible] necessary, removed with the growth, and the stump [illegible] the bladder wound.

[illegible] growth has encroached upon the trigone, or lies in close [illegible] the urethral orifice, resection should not be performed. [illegible] cases of recurrence the growth was situated in close [illegible] the trigone and ureters, and in 2 of these the size was so [illegible] to interfere with the manipulation at the lower part of [illegible]

[illegible] *of the Bladder and Kidneys.*—The greatest danger

at the time of the operation, and after recovery from it, is sepsis. Malignant growths of the bladder have a special tendency to spontaneous rupture [illegible]. Over 40 per cent of all the cases that have come under my observation have presented the clinical picture of spontaneous cystitis and were referred to me without a suspicion that a malignant growth underlay the cystitis. In 2 per cent of the cases the cystitis was so severe and persistent that operation had to be refused.

Cystitis is not only a danger to the patient from the pelvic cellulitis and other septic complications that may follow operation, but it greatly hampers the work of the surgeon, rendering the bladder cavity much smaller and the bladder wall difficult to manipulate.

Ascending pyelonephritis may be present before the operation, and accounts for some part of the operation mortality. It is a serious complication during the early part of convalescence when the case is already [illegible], and may cause death many months or some years after recovery from the operation. It is not more liable to occur when a ureter has been transplanted: in 10 of the author's cases resection of the ureter and implantation in the wound was necessary: in none of these cases did pyelonephritis develop.

Results of Operation for Malignant Growths.

Palliative Operations. These occasionally become necessary in order to treat symptoms. Apart from the relief given in this way, no permanent benefit is obtained. The patients survive from three to nine months, or less frequently, a year.

Removal of the Tumour. Removal only, without any attempt to remove the tissues round the tumour, does not appear to prolong life. Rahn collected 57 cases, with 8 deaths, or 14 per cent. Of the 49 survivors only 38 were followed. The most part were dead or suffer[illegible] recurrence, within a year. 4 were dead of recurrence in one and a half, two and a half, [illegible] years. 6 had not shown recurrence after periods of one, one and a quarter, two, four, and four and a half years.

Resection of the Bladder Wall.

1. *Operation-mortality.* Rahn collected 96 cases, of which 21 died, a mortality of 21·8 per cent. Roysing collected 16 cases, with 3 deaths, a mortality of 18·7 per cent.

The following personal statistics may be noted:

Brongersma	36	5	14
Heresco	4	1	25
Zuckerkandl	8	0	0
Thomson Walker	30	3	10

End-results. In 96 cases collected by Rahn, 75 survived the operation, but in only 52 was the late result known. [illegible] 31 cases

[illegible]owed till recurrence appeared, or death supervened: this occurred [illegible] six months in 13 cases, twelve months in 11 cases, in the second year [illegible] 1 case, after three years in 2 cases, after four years in 2 cases. There [illegible] 21 cases without recurrence. Of these, 12 were followed for less [illegible] in two years, while 9 were followed two years or over: 4 two years, [illegible] years, 1 three and a quarter years, 1 four years, 1 five years, and [illegible] six years.

In Rovsing's collected cases, 13 survived operation. Of these, 4 [illegible] died of recurrence from four and a half to nineteen months after [illegible]ration, and 1 died of cerebral tumour. The following cases are [illegible] to have survived: 2 one year, 1 seventeen months, 2 three [illegible] 1 six years.

Brongersma gives the following results in his cases: 9 cases died [illegible] recurrence or metastases under two years, 1 died some months [illegible] operation from pneumonia, 2 were still under treatment, 18 [illegible] neither recurrence nor metastases at periods varying from [illegible] months to seven years.

Kummel reports that of 47 cases of bladder resection for malignant [illegible]wth, 10 are well after six and a half, eight, fifteen, and sixteen years, [illegible] 1 died of recurrence ten years after the operation.

In 25 cases of resection by the author in which late information was [illegible]tained, there were 3 deaths from ascending pyelonephritis, and 6 [illegible]rrences, one of which was re-operated, and was well four years after [illegible] second operation. In 17 cases the patients were alive and without [illegible]rrence, as follows: six months after operation in 6 cases; twelve [illegible]nths in 3; eighteen months in 6; two years in 1; and four and a [illegible] years in 1. (Statistics, March, 1911.)

Total Extirpation of the Bladder (Cystectomy).—Of 39 cases collected [illegible] the literature, death occurred after the operation in 18, a mortality [illegible] 46·1 per cent. Only 10 cases could be traced, and in only 2 of these [illegible] period after the operation longer than fifteen months; 1 was [illegible] years afterwards (Hogge), and 1 sixteen years (Pawlik). Later statistics give an even higher mortality. Verhoogen and de Graeuwe [illegible] 59 cases of total cystectomy, with an operation mortality of [illegible]7 per cent. Of the 27 cases that survived the operation, 6 died in [illegible] first year, 7 died before the third year, and only 2 survived more [illegible]n three years. Cystectomy must, at the present time, be looked [illegible] as a desperate measure which holds out little, if any, prospect of [illegible]

J. W. Thomson Walker.

BLADDER, INJURIES OF.—(*See* ABDOMINAL INJURIES.)

BLADDER, TUBERCULOSIS OF.—It is well recognized to-day that [illegible] of the bladder is never, or only in the very rarest [illegible]ses, primary, and that it results from extension of tuberculous [illegible] from the kidney by way of the ureter, or the prostate or [illegible]al vesicles. This being the case, the prognosis depends largely [illegible] of the kidney or genital organs, and to these

the reader is referred. (See KIDNEY, TUBERCULOSIS OF; EPIDIDYMITIS, TUBERCULOUS.)

There are, however, some points that may suitably be discussed here.

1. **The Course of Untreated or Unsuccessfully Treated Vesical Tuberculosis.** The course of tuberculous cystitis is slowly progressive, with periods of improvement and periods of relapse, dependent partly upon changes of diet and climate. At the commencement there may be a period of acute cystitis which subsides, a short or acute cystitis periodica. More frequently, however, the onset is insidious and the progress very tardy. After some years the contracted calls to micturate become very distressing and the patient is worn out from loss of sleep. If septic complications are avoided, death takes place after some years from renal failure due to bilateral renal tuberculosis. More often, there are septic complications, caused almost invariably by infection introduced by a catheter, or after deformed the bladder by operation. Fever sets in, the patient wasts, the urine becomes foul-smelling. There is constant desire to micturate, unsatisfied by the passage, not pain and sudden, of a few drops of urine, very ten or twelve times. The sufferer is in agitation, continue day and night. During the day, the method of catheterization the more becomes necessary, owing to the active inconvenience which develops, and a rubber urinal is worn during the night. The rest is broken by the constant calls, and bed-wetting is frequent. Secondary phosphatic calculi form in the bladder and add to the pain and distress. Eventually exhaustion combined with septic absorption bring about a fatal result. A successful septic pyelonephritis may cut short the course of the disease.

2. **The Origin of the Tuberculous Infection.** Where tuberculous cystitis is secondary to renal tuberculosis, the prognosis varies at different stages of the disease. In unilateral renal tuberculosis, tuberculous cystitis affects the prognosis but little. The removal of the affected kidney is followed in most cases by a disappearance of the vesical infection, and the result is hastened by a course of tuberculin. It is a peculiarity of tuberculous cystitis, however, that even when the tuberculous infection has been quite cured, some increase in the frequency of micturition remains. Another point of interest in regard to these cases is that tuberculous ulceration of the bladder may be present, demonstrated by the cystoscope, and yet the urine be absolutely clear to the naked eye.

In the later stages of renal tuberculosis, tuberculous cystitis is a serious complication, from the constant irritation and loss of sleep that it produces, and especially from the danger of sepsis and ascending pyelonephritis.

In tuberculous cystitis secondary to tuberculosis of the prostate and seminal vesicles, the prognosis is not so good as in the early stage of renal tuberculosis. The results of treatment of the disease of the prostate and seminal vesicles by operation are not satisfactory, and septic

[illegible]dications are very frequent. Some cases react well to tuberculin, [illegible]t in many the improvement is only partial and temporary.

3. **The Results of Treatment.** Removal of the source of the [illegible]berculous infection, as for instance the kidney, is the basis of treat[illegible]t. Where this is impossible, as in bilateral renal tuberculosis or [illegible] it has failed, as in persistent tuberculous cystitis after nephrec[illegible] for unilateral renal tuberculosis, more direct measures are [illegible]ary.

Tuberculin treatment is the most successful method, and the most [illegible]rable cases are those where the original focus of tubercle [illegible] been removed. Where the infection is mixed, vaccines should [illegible]used alternatively with the tuberculin injections.

Local treatment by washing, or by instillation of various dru[illegible] [illegible]bly recommended by some authorities. The best known of these [illegible] is the repeated instillation of 5 per cent carbolic acid recom[illegible]ded by Roysing. Good results are claimed for this treatment, [illegible] exact figures are not available. With all these methods there i[illegible] a [illegible]nger of introducing sepsis and producing a mixed infection.

J. W. Thomson Wa[illegible]

BONE TUMOURS.—We have to consider the following growths of [illegible] osteoma, chondroma, sarcoma, carcinoma, multiple myeloma, [illegible]oid cancer,' and cysts. Epulis is discussed elsewhere (*see* Jaws, [illegible]mours of).

Several of the above can be dismissed with a few words.

Osteoma.—Ivory osteoma, usually arising about the orbit or on [illegible] jaw, is a progressive tumour of extremely slow but steady growth, [illegible]d does no harm unless it presses on important structures.

Cancellous osteomata and exostoses are usually capped by cartilage [illegible]ch ossifies at about twenty-one to twenty-four, when growth of the [illegible]eton ceases, so that the exostosis attains its maximum at that age. [illegible] sessile cancellous osteomata may, however, go on growing.

Complete removal is not followed by recurrence.

Chondroma.—A pure chondroma, such as may be found on the [illegible] of young adults, grows slowly but progressively, is not dangerous [illegible] and does not recur after removal.

Large, rapidly-growing cartilaginous tumours on a bone are usually [illegible] classed with the periosteal sarcomata undergoing degeneration, [illegible] are very malignant.

Myeloid Sarcoma.—By this we mean a very vascular, usually deep[illegible], central tumour expanding the bone, containing a great number of [illegible] cells under the microscope. It must be remembered that a [illegible]tral tumour of bone is not necessarily myeloid; it may be a malig[illegible]sarcoma, but this is uncommon. The older literature, including [illegible] of that utilized in Butlin's *Operative Surgery of Malignant [illegible]*, is quite unreliable in its description of the exact nature of [illegible] growth. He collected from the literature the following cases of [illegible] :

Humerus—10 cases—3 died of recurrence or metastasis (two of which were myeloid)—5 well over one to three years—2 well over three years. In one of these Butlin's amputation was performed.

Radius and Ulna—10 cases—4 died of recurrence (probably not myeloid)—3 well one to three years—6 well over three years.

Femur—14 cases—5 died of metastases (3 of these were myeloid), 2 recurred *in situ*—2 were well one to three years later, 5 were well over three years. Nearly all these were treated by amputation.

Tibia and Fibula—29 cases—2 died of metastasis or recurrence (one of each of sarcoma not myeloid)—9 well from one to three years—9 well over three years. Here again nearly all were amputated.

It will be observed, therefore, that in five cases myeloid gave rise to fatal metastases, but that 23 were well one to three years after and a further 22 were well over three years.

Coming to more modern investigations, we find that there is a general consensus of opinion that myeloid is practically an innocent tumour, and that it is very unusual for metastasis to occur when the diagnosis has been made by a reliable histologist. The writer knows of one recent case in which fatal secondaries appeared in the lungs.

On the other hand, Blood and Lepetit reports that 18 cases seen by himself are all alive and well. To added to this from the literature, we find that of 26 treated by scraping out, 5 recurred, but none formed secondaries; the other 21 were cured. Of 22 resected, 1 recurred and was amputated—the rest did well. Lexer reports 7 cases treated at the London Hospital by amputation, resection, or, in one case, scraping; all were well from one and a half to ten years after.

Eight cases treated in Bristol by resection or scraping out have all done well; except in one local recurrence took place in two cases scraped out.

We may conclude, therefore, that the risk of metastasis in the lungs exists, but is quite small; that inadequate local operations may be followed by recurrence *in situ*, but that almost all cases can be cured by an adequate operation. Amputation is only occasionally necessary, as for instance if the bone shell over the growth is very thin, and so great a length would have to be resected as to make the limb useless.

The operation mortality quoted by Butlin relates to ancient surgery; nowadays the risks are very small, probably not more than 1 or 2 per cent.

Periosteal Sarcoma—It is difficult to obtain accurate accounts of the prognosis of this disease from the literature, because so many statistics are hopelessly vitiated by the inclusion of cases of myeloid, or what is described as "mixed round or spindle cells and giant cells," which usually means myeloid. When this fallacy is eliminated, it becomes difficult to find cases of cure in patients with a genuine round- or spindle-celled sarcoma. The flat bones give better results than the long bones.

Kocher found only collected 17 instances of cure of periosteal sarcoma of the long bones after amputation in 1906. The more favourable

[illegible] of Wyeth, Bergmann, and the Tubingen clinic all include periosteal growths.

Alexis Thomson records 5 periosteal sarcomas of the femur and 2 of the humerus treated by amputation (Berger's in the latter cases), and one remained well, a femur patient being alive two and a half years after. Nanerede published, in 1909, the end-results of 65 cases of excision of the *scapula* for sarcoma. They were as follows: 10 were insufficiently followed; 35 cases died within two years; 7 cases died over four years. Death usually took place within a year (26 cases). In one case recurrence was as late as five years afterward. [illegible] has seen an unpublished case of mixed-celled sarcoma well more than three years after removal of the blade of the scapula. The operation mortality in Nanerede's series was about 10 per cent.

Sarcoma of the Humerus is terribly malignant. The mortality of Berger's operation since 1887 is about 6 per cent (Chavasse, Barlin, Dunt, quoted by Butlin). The only case of cure mentioned by Butlin in which the diagnosis was microscopically confirmed, was a growth at the lower end of the humerus amputated in Gottingen, and well at [illegible] years afterwards.

Sarcoma of the Femur is common, and is very malignant. The mortality of amputation at the hip-joint was considered to be about 2 per cent, but is probably less at the present time. In Butlin's series of 68 cases, only 2 lived for three years; 1 of these had had a growth for seven years, and it is not certain that the other was a malignant sarcoma.

A case treated by local removal at the Bristol Royal Infirmary in 1910, associated with repeated fractures in 1904, 1906, and 1910, was apparently cured in September, 1913. The microscopical report, by a front-rank pathologist, was fibrosarcoma.

Sarcoma of the Tibia or Fibula. In a series of 35 cases, Butlin found [illegible] alive and well after seven years, and 4 well between one and two years. The patient apparently cured had had the growth for eight years before operation. A case at the Bristol Royal Infirmary treated by amputation was quite well when last seen, fifteen months later. Recurrence is not usual in the stump, but the patient dies of metastases in the chest, with groin glands also invaded in many cases.

Sarcoma of the Skull.—Although of course the great majority of these cases are very unfavourable and proceed to a fatal termination in six or twelve months, with pressure on the brain, or an external fungating growth, there are a few instances in which the growth appears to be less malignant in nature. One such, removed at the Bristol Royal Infirmary in 1904, recurred in 1908, and was then the size of a hen's egg; it was again removed, and four years later the patient was known to be well, and is almost certainly still alive, though out of England. The microscopical diagnosis was fibrosarcoma. In another case seen [illegible] where the growth a spindle-celled sarcoma was stationary for five years (further history not known) after injections of Coley's

third. Jacobson and Mann both record patients living [illegible] after the first appearance of the growth. Bergmann claims [illegible] 17 cases operated on. [illegible] better result.

Sarcoma [illegible] *Carcinoma of the Jaw* [illegible]

It must be [illegible]

The [illegible] Bowlby [illegible] Of 36 cases [illegible] local removal [illegible] followed up and found to be cured several years after.

The other methods of treatment call for some consideration.

Coley's Fluid.—There are cases on record, one of which [illegible] where a sarcoma has disappeared after an attack of erysipelas, and Coley has [illegible] the value of his mixed toxins of erysipelas and *Bacillus prodigiosus* as a [illegible] in sarcoma.

Although the treatment was at first adversely reported on by an American surgical committee, Coley subsequently convinced its members and won them over to his side. The results in England are not as favourable as in America, but the writer has seen a patient with sarcoma of the temporal region explored, microscoped and found inoperable, cured and followed for many years after the treatment, and [illegible] sarcoma of the foot similarly treated has remained [illegible] for more than three years. There have been, of course, a number of failures besides.

Coley claims to have cured, and followed up for three or more years, [illegible] periosteal sarcoma of the femur and one of the tibia [illegible] were also amputated. This patient eventually died, more than ten years after, of a mixed epithelial sarcoma [illegible]. He also reports a case of sarcoma of the femur amputated and treated by Coley's fluid, well two and a half years afterwards, but in 10 other cases the fluid did no good. In other statistics [illegible] the injections are said to have cured over 100 cases of sarcoma [illegible] followed three years or more afterwards.

Personally, I do not think amputation of the [illegible] worth [illegible] in cases [illegible] the local [illegible]. I prefer Coley's fluid [illegible] successful.

Radium.—In one case known to the writer, radium treatment has arrested the growth of a sarcoma of the femur, verified by the microscope, for three years, and the patient obtained a commission in the Army, but it is too soon yet to speak of radium cures.

Carcinoma of Bone. This is always secondary, usually to cancer of the breast, and in the humerus often leads to spontaneous fracture; in the spine to great pain and pressure on the cord. The prognosis depends on whether there is evidence of growth in the lung or abdomen. Cancer of the bones may go on for months or years, but when the lung is obviously involved, it is fairly safe to say that the patient will not live six months, probably much less.

Multiple Myeloma, Myelopathic Albumosuria, Kahler's Disease.—This disease, characterized by endosteal swellings in various bones and by peculiar albumose called Bence-Jones protein in the urine, is very malignant and runs a rapid course, killing the patient in about two years.

The writer has seen a case, however, under the care of Mr. Hey Groves, in which the disease was arrested naturally, and the patient remained well after many years, but severely crippled by bad and spontaneous fractures.

Thyroid Cancer.—In this curious condition a tumour appears in the skull or sternum, often pulsating, having the structure of thyroid tissue, and associated with an enlarged or cancerous thyroid. The known cases all died, but Goebel relates some successful removals of such growth in bone.

Bone Cysts.—Cysts of bone are either of the nature of osteitis fibrosa cystica, has developed central cystic cavities, or hydatid cysts, usually in the lumbar vertebræ or hip-bone.

Simple bone cysts of the former variety reach a certain size and then remain stationary throughout life, giving rise sometimes to spontaneous fractures. Bloodgood reports the results of operation on 38 cases treated by curetting: 2 died of hæmorrhage, in another amputation was necessary for the same reason, and the other 35 did well.

Hydatid cysts of the spine are apt to enlarge progressively and compress the cord, but the results of operation are satisfactory.

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(*Reginald Short.*)

BRACHIAL PALSY. (*See* NERVE INJURIES.)

BRAIN, GUNSHOT WOUNDS OF.—(*See* GUNSHOT WOUNDS.)

BREAST, CANCER OF.

Prognosis apart from Operation. To foretell the duration of life in a patient with breast cancer is one of the most difficult problems which can confront the medical man. Indeed, in many cases no answer whatever can be given. This is not surprising when it is borne in mind that in the worst cases the disease may run its course in three months, while at the other end of the scale the patient may live for thirty years

[illegible] with a [illegible] throughout the whole of that time shows some [illegible] activity. But there are certain varieties of breast cancer in which a [illegible] prognosis is possible.

Acute Breast Cancer. If the whole breast is involved in a large [illegible] adherent to the skin or to the breast is fixed to the pectoral fascia, if enlarged hard glands are present in the axilla, and hence especially if the skin over the tumour shows a red [illegible] it can be predicted almost with certainty that the patient will be [illegible] and that no operation is of the least use.

Atrophic Scirrhus. In certain cases in old people the nipple may be [illegible], or a definite local depression may make it appear [illegible] point in the skin over the breast, while the whole breast becomes somewhat shrunken; no tumour can be felt in the breast, nor are the glands enlarged. Such a case is an example of atrophic scirrhus in its extreme form, and it is possible to assert that the patient will probably go on for a number of years without pain or trouble of any kind. Ultimately, however, and especially if the breast is too freely examined or massaged, it is probable that a tumour will develop, that the glands will become enlarged, and that the case will then slowly run the ordinary course of breast cancer. But if, as frequently happens, the patient is already old when the tumour is discovered, the probabilities are that she will die of some other condition.

In the less typical forms of atrophic scirrhus, a small hard lump is present which changes its character but little for extensive periods of time. In such cases a prognosis of some years' duration of life, say up to ten, may be given with probable approach to accuracy.

Carcinoma during Lactation. If a breast cancer develops during lactation, although it may make little progress so long as suckling is continued, it will probably grow rapidly when the milk ceases to be secreted, and the prognosis is a bad one.

Mastitic form of Carcinoma. As a rule, cancer of the breast forms a rounded lump which bears no relation to the anatomical outlines of the lobes of the breast, but there are certain cases where the cancer commences throughout the substance of one or more lobes. Such cases generally originate as a chronic mastitis. The tumour formed resembles, in its sector-shape, the thickenings of chronic mastitis; that is to say, it marks out the limitations of one lobe or a group of lobes. The induration is, however, much more definite and tumour-like than is usually the case in chronic mastitis, and the axillary glands will probably be large and hard, but not tender. A diagnosis may be difficult, but this question does not now concern us. It must be recognized that this form of carcinoma, perhaps owing to its multicentric or diffuse origin, is of particularly bad prognosis, and that recurrence is likely to take place within a year after operation.

Duct Carcinoma. The recent work of Mr. Lenthal Cheatle has shown that duct carcinoma is much commoner than has been supposed, and that it is probably almost as frequent as carcinoma originating in the acini; but the typical form of duct carcinoma of

large ducts, which originates beneath the nipple in women of advanced years without causing retraction of the nipple, is a comparatively benign tumour and runs a somewhat slow course. The prognosis after operation is distinctly good.

Ordinary Scirrhus.—It is only in the exceptional forms of breast cancer that a definite opinion as to duration of life can be expressed. In the ordinary scirrhus of the breast not operated upon, cases which are apparently similar may live for varying periods. The younger, fatter, and more healthy-looking the patient, the shorter is life likely to be if no operation is performed. So long as the disease continues limited to the parietes of the body, and does not involve the visceral cavities, duration of life remains uncertain; but from my experience I can state with some confidence that when there are visceral deposits, whether in the chest, abdomen, or head, the patient's life is unlikely to be prolonged more than a year. Many die within six months after the first onset of visceral deposit. The process of permeation which causes breast cancer from its point of origin to one or other of the great visceral cavities is slow in operation, and probably subject to periods of alternate quiescence and activity. But once a serous cavity is reached, the cancer is in a far-spreading land of plenty. Its cells accordingly proliferate actively and soon attack vital organs.

Causes of Death in Untreated Breast Cancer.—Although dissemination is the rule, a cancer of the breast may run its course without producing secondary deposits. In these cases the patient may die from exhaustion, haemorrhage, or sepsis.

When dissemination occurs, death often takes place from serous effusions caused by lymphatic obstruction, itself the result of widespread permeation. It is in this way that ascites, pleural effusions, and pericardial effusion are produced. Œdema of the lung, simulating a low form of pneumonia, is probably caused in the same way. Less frequently paraplegia due to spinal deposits, or cerebral growths, may be the cause of death. Haemorrhage from the primary growth may be directly fatal. The average duration of life in untreated breast cancer is stated by Campiche and Lazarus Barlow to be about four years.

Prognosis as regards Recovery from Operation.—Although the modern operation for breast cancer is apparently a severe one, it does not produce marked shock if care is taken, especially in regard to preventing chill during the operation. Even old persons stand it well. Nevertheless, in hospital practice there is a definite death-rate, mainly due to the risk of infection arising from the collection of mixed surgical cases in one ward. This risk may be placed at from 1 to 2 per cent. My personal experience in hospital practice includes the loss of cases from influenza (at the time of an epidemic), erysipelas, bronchopneumonia, and pulmonary embolism. In a nursing home or private house, on the other hand, I have never lost a case, a fact which appears to show convincingly that the belief that a hospital is the safest place for operation is not borne out by experience.

Prognosis as regards Recurrence after Operation. It cannot be too strongly emphasized that the prognosis after an operation for [illegible]

[illegible]

[illegible] rather more than 50 per cent have remained free from recurrence for three years and upwards. It is probable that further improvement in these results must be sought in the better [illegible] the early signs of cancer. [illegible] to attempt to improve them by a more [illegible] selection of cases [illegible] operation for statistics [illegible]. Included in my series are [illegible] were both [illegible] inoperable by all ordinary [illegible] the patients were able to do full work for periods of one and two years respectively after the operation.

Amongst the cases of breast cancer operated on by Dr. Halsted and his assistants in the Johns Hopkins Hospital and other hospitals in Baltimore, the cures reckoned five years after the operation are about 40 per cent. If, however, the cancer is seen in such an early stage that the diagnosis can only be made by an exploratory incision, and if the complete operation followed immediately on the exploratory incision, 80 per cent of the patients remained well after five years. According to Bloodgood, who gives these statistics, the outlook is entirely different if the radical operation is not carried out at the same sitting as the exploratory one. Should an interval elapse between these two procedures, Bloodgood states that the probability of the five-year cure is reduced from 80 per cent to about 25 per cent. The experience of Bloodgood in this respect is not in accordance with my own. I do not believe there is much danger in the [illegible] by a short interval between the exploratory and the radical operation, although it is desirable to combine the two.

The most favourable published statistics of the operation for breast cancer are those recently obtained by Professor W. R. Rodman, of Philadelphia, and brought forward by him at the London Clinical Congress of American Surgeons in August, 1913. These statistics refer to 50 private cases operated upon three or more years ago. Of this number 13 are dead, 1 has a recurrence in the mediastinum after three years of apparent good health, and is accordingly reckoned among the dead, and the remaining cases, constituting 72 per cent of the total, are well after three years. As Dr. Rodman says, these

[illegible]ts could not be obtained in hospital practice. Private patients [illegible] earlier, offer better resistance, and will keep under observation [illegible]nitely, thus permitting a second operation if necessary. Several [illegible] this cases have been saved by second operation, a point in which [illegible] [illegible]nce agrees with my own. Dr. Rodman adds that some of the [illegible] so early that a clinical diagnosis of cancer could not possibly [illegible] made until after histological examination. These results, which [illegible] not been equalled in this country, probably indicate that in the United States the public are better educated in regard to the danger [illegible] cancer, and, dreading operation less, seek advice in an earlier [illegible] [illegible] The further improvement of English results depends [illegible] the education of the public in this direction.

I may add that Dr. Rodman accepts my own conclusions as to the [illegible]e of dissemination of carcinoma, and that the operation he [illegible] in accordance with the conclusions of the permeation theory [illegible]mination.

Prognosis after Recurrence. It is too much the custom to abandon [illegible] and sit with folded hands when, after an operation for breast [illegible] recurrence has declared itself. It is true that in such cases [illegible]ate outlook is generally bad; but if the recurrence is recognized [illegible]ly and treated vigorously, it may be possible to prolong the [illegible]'s life for at any rate some [illegible]

The modern operation for cancer, followed up by a prophylactic [illegible] of *x* rays, has practically abolished the irregular recurrences [illegible]ith the flaps, and in the immediate neighbourhood of the scar, [illegible] were so frequently seen before the centrifugal spread of the [illegible]se in the lymphatic plexus of the deep fascia had been detected. Now that the nature of the process of permeation is understood, it is [illegible] to avert such recurrences by properly "centering" the operation [illegible] the point of origin of the growth, and by paying special [illegible]tion to the removal of a maximal circular area of the deep fascia [illegible] area of which the point of origin of the growth must always be [illegible] centre.

After a well-designed operation, recurrence, if it takes place, will [illegible] be found in one of two places: either in the upper intercostal [illegible] second, third, and fourth originating from glands of the [illegible]terior mediastinum which were already infected at the time of the [illegible]ration, or it may be found in the supraclavicular glands. Subcutaneous, cutaneous and fascial, subclavian, or visceral recurrences [illegible] also occur.

Intercostal Recurrence.—The first variety of return may be described [illegible] intercostal recurrence. It is signalized by the appearance of fascial [illegible], at first unadherent to the skin, at the inner ends of one or [illegible] of the intercostal spaces mentioned. In such cases further [illegible]tion is useless. But though such cases are apparently hopeless, [illegible] have been treated successfully by several methods. Halsted [illegible] used the actual cautery with success. I have employed for their [illegible]atment the method of secondary *x* rays, in which metallic particles

[illegible] *Recurrence.*—If the patient is seen at regular intervals subsequently to the primary operation, and is carefully examined, recurrence in the supra-clavicular glands will be detected at a time when the glands are still freely movable and not of great size. In these circumstances there can be no doubt whatever that the right treatment is operative, but it is useless to perform a limited form of operation, as limited to the parts below the sternum. The whole of the tissues in the angle must be cleared of its glands, from the mastoid process down to the sternoclavicular joint, and outwards as far as the edge of the trapezius. The tissues containing the glands should be removed en masse. The operation required is an extensive one, and it is necessary to open the carotid sheath, and to carry the dissection down to the innermost aspect of the thoracic cavity, removing all the tissues between the sternomastoid and the scalenus anticus. The operation is not one which should be undertaken by the inexperienced. My experience shows that frequently for two years or more one is justified in hoping that almost always the patient will be freed from the terrible prospect of a mass of growth fixed to the bed of the neck, and causing agonizing pain. If the disease returns, it is likely to do so in a painless form within the chest. It is advisable at the time of operation to introduce one or more tubes of radium beneath the flap, for a period of twenty-four hours, with the precautions to prevent injury to the skin flap.

The foregoing remarks apply to early supra-clavicular recurrence. If the glands are large and especially if they are fixed, an operation is rarely advisable, and if it is performed local recurrence is very likely to take place. In this event the recurrence will be a distinct one, and the patient's condition is rather aggravated than improved by the operation.

Subcutaneous Recurrence.—If after an operation nodules appear over a region corresponding to the area of contact of the breast with

[illegible] wall and if these nodules are adherent to the ribs and [illegible] to the skin, it may be inferred that at the time of the operation [illegible] operation had extended into the lymphatics of the intercostal [illegible] In these circumstances recurrence is of course inevitable, and [illegible] prophylactic course of *x* rays is able to destroy the remaining [illegible] loci. This form of recurrence, though unavoidable, is [illegible]ately not common. It may be spoken of as subcaminatis [illegible]

Cutaneous and Fascial Recurrence.—The form of recurrence which follows inadequate operation for breast cancer is usually that known [illegible] recurrence, in which nodules appear in or near the scar of the [illegible] If these nodules are cutaneous, i.e., fixed to the skin, they [illegible] be excised if they are near the scar; but if they occur at the [illegible] of the field of operation, or are fixed to the deep fascia, they [illegible]ably indicate inadequate removal of the deep fascia, with widespread and inoperable extension of the disease in that layer. Under these circumstances the only treatment is by *x* rays, intensified by [illegible]th injections, and the ultimate outlook is a bad one.

Subclavian Recurrence.—When during an operation for breast cancer the subclavian glands are left behind, these glands are usually the seat of recurrence. This is a form which is extremely likely to occur in the practice of inexperienced operators. The subclavian glands are situated beneath the costocoracoid membrane, below the clavicle and above the pectoralis minor, at the extreme apex of the axilla. Recurrence in these glands is indicated by a lump deeply situated behind the pectoralis major and immediately below the clavicle. To this [illegible] the lump may become adherent in the latest stage, simulating a deposit of cancer in the clavicle itself.

The prognosis in subclavian recurrence is a very grave one, though [illegible]ction, if undertaken early, and followed by vigorous radiation, [illegible] extremely hopeless, especially if it be combined with the use of [illegible]

Visceral Recurrence.—When signs of the return of the disease in the [illegible]ior of the thorax or abdomen have made their appearance, it is [illegible]le to give a precise prognosis. Before the disease has reached [illegible] visceral cavities, a cautious man will often refuse to give any [illegible]mate of the duration of life: it may vary from a few months to [illegible]nty or thirty years. When the signs of visceral return are manifest [illegible] an almost invariable rule that the patient will die within a period [illegible]ceeding a year, and not usually exceeding six months. In such [illegible] treatment is of no avail, though it has appeared to me that [illegible]times open-air methods on the lines of sanatorium treatment for [illegible] have somewhat deferred the inevitable result.

Influence of X-ray Treatment on Prognosis.

Prophylactic X Rays.—A course of prophylactic *x* rays subsequent to [illegible]ation for breast cancer should never be omitted. It is known [illegible] at any rate in some cases, *x* rays may cause the atrophy and [illegible]ppearance of large masses of cancer cells. How much more

[illegible] therefore they must be when applied to small undetectable [illegible] of cancer cells which may possibly lurk in the tissues subsequent to an operation for breast cancer, especially since by the [illegible] of the breast these microscopic groups are brought nearer to the surface [illegible] of being protected by the whole thickness of the [illegible]. But the value of *x* rays does not rest on *a priori* considerations. My own experience conclusively proves their value. In [illegible] only [illegible] times has recurrence been observed [illegible] of these cases with at most [illegible] which for one reason or another had escaped the [illegible] all six cases. The fact [illegible] pro[illegible] extended deeply, e.g., to [illegible]. Consequently, though these [illegible]

[illegible] *X Rays.* Professor C. G. Barkla some years ago called [illegible] The [illegible] I have been [illegible] of these [illegible] The [illegible] This form of recurrence, so far as my previous experience went, seemed [illegible] I injected bismuth into the intercostal spaces, and [illegible] by Mr. C. R. Lester. The nodules completely disappeared, and at the present time (five years later) the patient remains quite well.

Influence of Radium Treatment on Prognosis. — Speaking [illegible] in mind that radium has a purely local action of [illegible] range, its field of usefulness in cancer of the breast is restricted by the fact that, except in early cases for which operation is the only trustworthy treatment, the area of extension of the disease [illegible] to be dealt with by the amount of radium ordinarily available. Owing to this feature of the disease, *x* rays in a majority of cases provide a more suitable form of radiation. But if a recurrence [illegible] local and limited, as is often the case for instance in intercostal recurrence, radium possesses one great advantage over *x* rays. It is possible to introduce the source of radiation into the centre of, or in close proximity to, the focus of disease, and thus to give a dose

radiation which could never be applied through normal structures such as the skin without grave injury to them. In old persons too [illegible] for operation, radium may be buried in the primary growth as a preliminary to x-ray treatment, especially if the growth is too massive to be penetrated by x rays from without. Radium is also suitable for the treatment of localized recurrent nodules which resist, or are [illegible] istly accessible to, x rays.

Marked and complete retrogression may occur in local masses of cancer cells subjected to radium, but only in rare cases can a cure of the disease be hoped for—namely, in cases where such a single mass of cancer cells is the only focus of growth present, and is unaccompanied by microscopic extensions of the disease in other parts.

Influence of Pleural Adhesions on Prognosis.—It is an interesting and [illegible] one which should be taken into account in estimating [illegible] that obliteration of the pleural cavity checks dissemination to a [illegible] able extent. This I have been able to show by analyses of the [illegible] ties of the Middlesex Hospital cancer wards. Marked pleural adhesions were present in 37 of the 329 cases. Cancerous [illegible] of the pleura was present in only 11 of these 37 cases, or [illegible] while of the sum total of Middlesex Hospital cases 44 per [illegible] had pleural invasion. In 3 of these 11 cases the adherent [illegible] on the side of the growth had escaped invasion, while the [illegible] non-adherent pleura was cancerous.

[illegible] may at first appear to be thrown on this evidence of the [illegible] tection of an adherent pleura by the fact that only 30 per [illegible] cases with pleural adhesions were absolutely free from [illegible] compared with 33 per cent of the sum total of cases. [illegible] protective action of an adherent pleura extends only to the [illegible] cavity. It has been shown that in a large proportion of cases [illegible] of the abdomen occurs, not by way of the thorax, but directly [illegible] the epigastric parietes. Pleural adhesions do not check this, [illegible] perhaps, indeed, their resistance to the deep extension of [illegible] may accelerate the progress of fascial permeation, and so [illegible] favour epigastric invasion. It is a most striking fact that [illegible] of the 37 cases with marked pleural adhesions showed the [illegible] invaded by cancer and the chest free, while only 12 per cent [illegible] of 329 cases showed a similar state of affairs. The converse [illegible] is equally striking. While 22 per cent of the Middlesex [illegible] ropsies show the thoracic cavity invaded and the abdo[illegible] only 5 per cent of the cases with pleural adhesions show a [illegible] state of affairs. These facts are a strong indirect testimony [illegible] the frequency of epigastric invasion and to the protection [illegible] by pleural adhesions to the thoracic cavity. Incidentally [illegible] provide a strong argument against the embolic theory, showing [illegible] the abdomen and invasion of the thorax are independent [illegible] events.

The foregoing facts convey a therapeutic suggestion—namely, that [illegible] cavity on the affected side could be obliterated by

artificially induced adhesions, life might be prolonged. Unfortunately the injection of irritant fluids into the pleura is known to be attended by danger. In two cases in which there was evidence of early pleural involvement at the base of one lung I have injected radium emanation, and a sterilized suspension of bismuth carbonate, respectively. In the latter case the injection was made as a preliminary to x-ray treatment. In neither case did any benefit result. *W. Sampson Handley.*

BREAST, SIMPLE DISEASES OF. We shall consider the prognosis of: (1) *Chronic mastitis*; (2) *Tuberculosis*; (3) *Fibro-adenoma*; and (4) *Paget's disease of the nipple*. None of these diseases involves any direct danger to life, and the interest of the prognosis centres around the possibility of the subsequent development of cancer.

1. **Chronic Mastitis.**—In young women this condition presents no immediate danger. After the age of forty it is to be regarded with grave suspicion. Very convincing evidence has now accumulated to show that cancer of the breast, like cancer elsewhere, is invariably preceded by chronic inflammation. Bryant found a history of mastitis in 80 out of 360 cases of cancer. Microscopically, Beadles was able to demonstrate pre-existing mastitis in every one of 100 breasts removed for cancer at the Brompton Cancer Hospital, although in the majority of the cases no signs had been evident clinically.

Quite apart from the possibility that mastitis may give rise to cancer, there is the very important question of the uncertainty of the diagnosis of a lump in the breast. It is a sound surgical rule, at any rate after the age of thirty-five, that any lump in a woman's breast is better cut out.

2. **Tuberculosis.** This is a very chronic disease, with no tendency to spontaneous cure. The breast eventually becomes riddled with abscesses, and in about 20 per cent of cases phthisis finally develops. It is wise, therefore, to effect an early clearance.

3. **Fibro-adenoma.** Generally speaking, a mobile, well-encapsulated lump in a breast, confidently diagnosed as fibro-adenoma, is safe enough, and for years it does not alter in size. Microscopically, however, it is common to find that a recently observed tumour shows fibro-adenoma becoming malignant. There are a few cases on record of very old-standing and encapsulated swellings undoubtedly innocent eventually becoming carcinomatous. One of these is in the museum at St. Bartholomew's Hospital.

Removal of a genuine fibro-adenoma, verified as such by the pathologists, is very rarely followed by recurrence.

4. **Paget's Disease of the Nipple.** This is not really a benign condition. If an apparent eczema of the nipple, in a woman over forty, fails to respond to treatment, and becomes red, raw, and angry, it is almost certain that the breast is already cancerous, though nothing can be felt. The tumour will become evident, generally in one to two years, but in rare cases it may be delayed for ten years. Fortunately the cancer is often of a slow type. The prognosis is, therefore,

[illegible] of scirrhus. If treated by early radical removal on the lines of the modern operation for cancer of the breast, the results are as good [illegible] the most favourable types of scirrhus, but exact figures are not [illegible]ble. Radium and *x* rays will frequently ameliorate the eczema, [illegible] will not prevent the onset of the cancer. *A. Rendle Short.*

BRIGHT'S DISEASE.—(*See* NEPHRITIS.)

BRONCHIAL ASTHMA. (*See* ASTHMA, BRONCHIAL.)

BRONCHIECTASIS.—When this is the sequel of measles or of [illegible]opine-cough in childhood, and the dilatation is moderate, [illegible] often complete, is probably the rule rather than the excep[illegible] provided that death does not result owing to the severity of [illegible]mary disease. The more diffuse the bronchiectasis the worse [illegible] prognosis, and consequently cases which are caused by pleural [illegible]on, collapse of the lung, and especially unresolved pneumonia, [illegible] run a shorter course than those due to chronic bronchitis.

The disease in [illegible] few cases runs an acute febrile course; but in the [illegible] the tendency is towards chronicity, and instances are on [illegible] in which life was prolonged for forty to fifty years.

The prognosis in an individual case is difficult, for it is hard to [illegible]ate the risk of the complications which are usually associated [illegible] a fatal termination. The more immediate modes of death are [illegible]s, bronchopneumonia with septic absorption, haemoptysis [illegible] thorax, gangrene, tuberculosis, lardaceous disease, metastatic [illegible] (especially cerebral abscess), and cardiac and renal complica[illegible] In connection with this point, Lebert's figures of the effect [illegible] disease on the general health in 80 cases are interesting:

[illegible] 80 CASES SHOWING THE EFFECT OF BRONCHIECTASIS ON THE GENERAL HEALTH.

[illegible] health	17	21
[illegible] distinct disturbance of health	28	35
[illegible]bance without complication	15	19
[illegible] diarrhœa, with complications directly [illegible]ting from the disease	3	4
[illegible]ce with accidental comp[illegible]	[illegible]17	21

Lebert gave the following figures as representing the duration of [illegible]se in 52 cases: Under one year, 21·1 per cent; one to two [illegible] 7·7 per cent; three to five years, 30·7 per cent; six to ten [illegible] 15·5 per cent; over ten years, 25 per cent.

[illegible] the amount of [illegible] the age of the patient, the extent [illegible] and other circumstances, chiefly of adequate [illegible] and the presence of complications [illegible] If there is little evidence of absorption of [illegible] the patient is well nourished and it be can be [illegible] towards [illegible] When, however, the complications previously mentioned [illegible] has been [illegible] Again, [illegible] the [illegible] Further, vaccine treatment [illegible]

[illegible] death may come sooner as the direct result. [illegible]

BRONCHITIS.

Acute Capillary Bronchitis. This condition is always associated with [illegible] Children and old people. [illegible]

[illegible] we have to take into account the [illegible] of the patient. Unfavourable [illegible] of nervous [illegible] or cessation of expectoration owing to feebleness; cyanosis or other signs of right heart failure; delirium, coma, or convulsions.

Acute Bronchitis of the Larger Tubes. In mild cases the duration [illegible] but severe cases seldom last less than three to four weeks. Recovery is always slow if emphysema [illegible] and the precautions taken to avoid this have much influence on both the immediate and remote effects. The disease is rarely fatal, except in young children and old people, in the acute asthenic type, or when the disease is a complication of nephritis, heart disease, diabetes, chronic bronchitis associated with heart failure, or emphysema; but the mortality is largely affected by adequate treatment. Signs of

[illegible] are marked cyanosis, prostrating vomiting in the [illegible] [illegible] dyspnœa, short ineffective cough with [illegible] [illegible] and irregular pulse, cold clammy skin, and a tendency to sink down in the bed.

Chronic Bronchitis of the Larger Tubes. In [illegible] [illegible] marked improvement [illegible] and in a fair proportion of cases all urgent symptoms eventually disappear. After middle age there are few complete recoveries. This is chiefly owing to the recurrence of acute attacks and the increase of emphysema, more especially when the disease is dependent upon or associated with cardiac or renal disease. The course of the disease is however, usually prolonged. The intensity of the symptoms and hence the duration of the disease, are much affected by climatic conditions and by the amount of care the patient can devote to his health. Much can be done by medical treatment, such as vaccine therapy, to ward off acute attacks and to lessen the cough and stress upon the heart; while pressure baths often have a favourable influence upon the emphysema.

Plastic bronchitis affords a fairly good prognosis, and patients have been known to live for more than twenty-five years from the commencement of the symptoms. There is a tendency toward the development of ordinary bronchitis with its usual complications, and cases are recorded in which the casts have led to suffocation.

Purulent Bronchitis. Epidemics of purulent bronchitis have been noted during the war both in France and at Aldershot. The cause of the disease appears to be the influenza bacillus. It is possible that pneumococci present in the lung development a higher degree of virulence by symbiotic growth, and that the fatal termination, which may occur in as high a proportion of cases as 25 per cent, is due to pneumococcal septicæmia.

Arthur [illegible]

BRONCHOPNEUMONIA. This disease is always associated with the capillary bronchitis. The prognosis is graver in every second case, and the mortality may be as high as 30 or even 56 per cent. It is greatest in young children, and especially so below one year of age. In young infants, and in rickety or badly nourished children, brought up under insanitary conditions, the probability of a fatal termination is always considerable. This is especially true of bronchopneumonia complicated by whooping-cough. The greater the extent of the disease, the graver is the outlook. Primary cases have a lower mortality than secondary ones; thus, bronchopneumonia following pneumonia has a mortality only half as great as bronchopneumonia following diphtheria. The chief immediate causes are heart failure, uræmia, and hyperpyrexia; that is to say, the amount of toxemia in relation to the patient's strength, and the extent of the disease are the determining factors. Convulsions at the commencement of the disease have not so much significance as those at a later period. The character of the pulse is usually a better guide than the rate of

[illegible]

[illegible]

It is [illegible] the average dosage [illegible] varies according to the patient's physical condition and power of [illegible]. In [illegible] there is a great tendency towards relapse and [illegible] considerable [illegible] especially with regard to [illegible].

[illegible] experience [illegible] of 5 c.c. of fresh normal horse serum [illegible] in the early morning, so long as fever continues [illegible] the mortality of this disease [illegible].

BULBAR PALSY. [illegible] bulbar paralysis of nuclear origin is, perhaps, [illegible] the most chronic of progressive muscular atrophies, viz. MUSCULAR [illegible] affecting the motor nuclei in the medulla. [illegible] and the prognosis is [illegible] within a year or at most two years [illegible] the bulbar symptoms. Sometimes the disease appears to be [illegible] for a few months temporarily arrested, by the hypodermic administration of strychnine in full doses.

Sudden, [illegible] bulbar palsy is always [illegible] due to arterial obstruction and especially to apoplectic thrombosis. When the bulbar palsy takes several days or [illegible] to develop (a less common occurrence), the condition is dependent upon acute inflammatory changes in the medullary nuclei [illegible] to those which occur in the spinal cord in acute anterior poliomyelitis. The prognosis is [illegible] these two classes of bulbar paralysis is relatively good if the patient survives the acute stage, since the lesion is not a progressive one. The actual bulbar symptoms, however, remain stationary, for the nuclear disease is irreparable.

Other cases of bulbar paralysis are due to infranuclear and extranuclear causes, [illegible] the motor nerves of the bulb below their nuclei of origin. Such cases occur in [illegible] and in chronic [illegible] affections, [illegible] or tuberculosis. The symptoms develop much more slowly, and are often asymmetrical and even unilateral in distribution. Save in the cases of syphilitic origin, the prospects are unfavourable.

In **Pseudo-bulbar Paralysis**, where the patient has the same difficulty in articulation, deglutition, and phonation as in ordinary bulbar palsy, but without atrophy or fibrillary tremor of the affected muscles,

[illegible] entirely different. [illegible] The common [illegible] of a patient who has had an ordinary attack [illegible] without further symptoms. [illegible] attacks of [illegible] without [illegible] further phenomena. [illegible] however [illegible] attacks of hemiplegia [illegible] symptoms [illegible] and [illegible] The [illegible] when we meet with a [illegible] with the [illegible] symptoms [illegible] The prognosis in [illegible] true [illegible] symptoms do not tend to get worse [illegible] to a considerable extent. The [illegible] prognosis depends on the [illegible] which has produced the bilateral hemiplegia. (See [illegible].)

[illegible]

BURNS AND SCALDS. A burn [illegible] or [illegible] accident to an [illegible] total destruction [illegible] but there are several points of importance [illegible] in prognosis.

The Nature of the Burn. [illegible] and depth [illegible] determining [illegible] prognosis, except of course in [illegible] [illegible] burn of the [illegible] degree [illegible] is not so dangerous as a [illegible] burn [illegible] Third degree burns, [illegible] the sensitive papillae of the dermis [illegible] [illegible] burn of the [illegible] [illegible] half of the body surface is burnt death is inevitable. In the [illegible] of cases a burn of one-third will also be fatal. In [illegible] practice about a third of the cases admitted die. [illegible] with [illegible] pressure on the [illegible]

Influence of Age. Children and aged persons are [illegible] likely to die from the shock of a burn.

The Time Factor. In the majority of the fatal cases death takes [illegible] within forty-eight hours (128 out of 207 cases, [illegible]), and [illegible] doubt most of these patients die from shock. Stupor [illegible] prostration and a quick weak pulse point to a probable [illegible] There is however a curious group in which [illegible] appear to be due, not to shock, but to some [illegible] in the blood. Such cases [illegible] for instance, develop signs of [illegible] thrombosis [illegible] three days after the accident, with [illegible] the heart and very irregular pulse. [illegible] duodenal ulcer is [illegible] another evidence of the same blood changes. [illegible] may be due to a similar cause and is of very grave import. [illegible] patient survives the first few days the prospect of recovery [illegible] depends upon how effectually suppuration [illegible] controlled. Pneumonia, [illegible] and [illegible] appear to [illegible] nearly every case to proceed from suppuration.

The Effect of Treatment. T[illegible] no doubt that careful treatment may make all the difference between life and death in a considerable number of cases. [illegible] Warmth is a [illegible]

[illegible]

Complications. *Pneumonia, pericarditis,* and [illegible] [illegible] St Bartholomew's Hospital [illegible] These ulcers are probably due to [illegible]

[illegible]

[illegible]

[illegible] burns appear to be particularly liable to undergo malignant change, several members of our own profession having been victims.

Scald of the Larynx. Children who have been trying to drink from the spout of a kettle are liable to this accident. Unfortunately there may be no serious [illegible] at first, only a little hoarseness, for several hours, and lives have been lost by children being sent away from a hospital at this stage. A few hours later they are brought up again with laryngeal stridor, cyanosed and struggling for breath.

[illegible] immediately treated, may be too late to save the [illegible]. With proper supervision and prompt [illegible] there is no great danger. *[illegible]*

CALCUM, TUBERCULOUS. This somewhat uncommon [illegible] is [illegible] diagnosed as carcinoma, forming, as it does, a hard [illegible] in the [illegible]. We have not much information [illegible] of the complaint. It is customary to remove it [illegible]. The mortality after removal by operation is given [illegible]. Of 58 cases in the literature since 1900, 12 per cent died (Hartmann); of 130 other cases in the literature, 30 [illegible] and 17 per cent [illegible]. [illegible] 25 per cent died. [illegible] probable [illegible] the trigo[illegible]. [illegible] *[illegible]*

CALCULI, PROSTATIC.—*(See* PROSTATIC [illegible]*)*

CALCULI, RENAL.—*(See* KIDNEY AND URETER, CALCULI OF*)*

CALCULI, VESICAL. *(See* BLADDER, CALCULI OF*)*

CANCER. *(See* VARIOUS ORGANS*)*

CANCRUM ORIS. This term should not be used for [illegible] severe stomatitis unless there is black sloughing of the cheek. But [illegible] this way, the prognosis is very grave; it is given by Keen [illegible] per cent. Death takes place within ten to fourteen days. [illegible] child recovers, there is usually a horrible deformity which [illegible] skill and many operations to remedy.

The outlook in a particular case depends on the extent of the [illegible] and on the degree of toxæmia. If the patient is already [illegible] by measles or other illness, if there is a [illegible] lung [illegible] operation, the death is almost inevitable. The best [illegible] recovery is in those seen early, not extensive, promptly treated, [illegible] little toxæmia. *[illegible]*

CARBUNCLE. Although usually not a dangerous disease, it must [illegible] borne in mind that a large carbuncle involves serious danger [illegible] when it occurs in a vascular part, such as the lip or face, [illegible] alcoholic, diabetic, or broken-down individuals. Spreading, in spite of treatment, delirium, pyæmic abscesses, or rigors all mean a grave prognosis. Of cases sufficiently severe to be admitted to a hospital, about half die. *A. Rendle Short.*

CARCINOMA.—*(See* VARIOUS ORGANS*)*

CARDIAC SYPHILIS [illegible]

[illegible]

Prognosis as to Life [illegible]

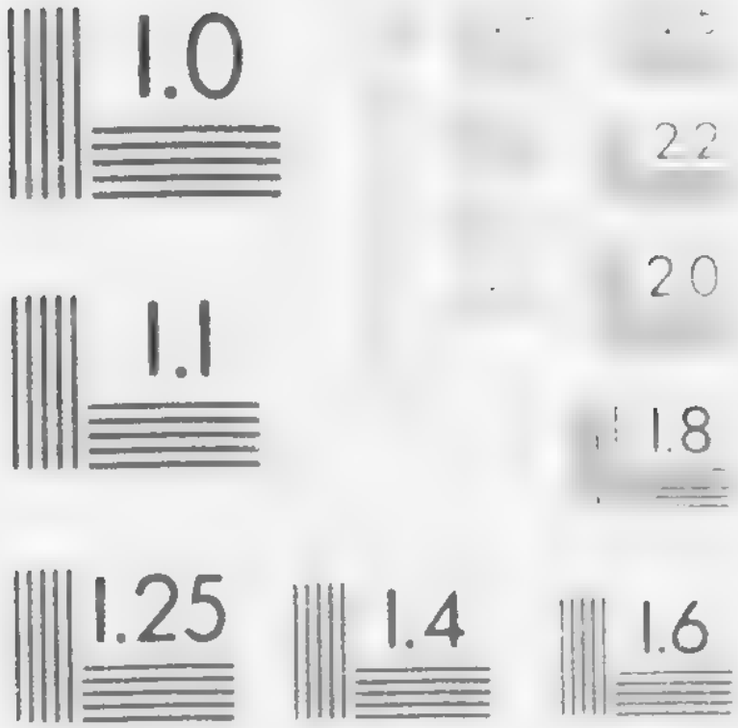
[illegible]

[illegible]

[illegible] to better prospects in any individual case. The most important [illegible] are those that bear on the condition of the cardiac muscle.

[illegible] of patients' lives may be prolonged [illegible]. The [illegible] include the signs of acute obstruction of a coronary artery or branch, the development of a pericardial sac, a pericardial pleurisy, a pericardial pneumothorax, [illegible] and [illegible] of the heart. Some of these are [illegible] Of these, the last four are the most favorable prognostic of sudden death, and indeed there is [illegible] [illegible] in these cases than the appearance of a [illegible] crisis that has been preceded by [illegible] [illegible]. Anything indicative of coronary obstruction carries with it a threat of sudden death. While heart block is a [illegible] [illegible] the appearance [illegible] endangers the patient's life [illegible] [illegible] or incomplete attack. Although the [illegible] [illegible] upon the mind by the [illegible] [illegible] [illegible] [illegible] that these [illegible] [illegible] the macroscopic appearances of a widespread infection [illegible] [illegible] of the heart muscle [illegible] [illegible] [illegible] [illegible]

MICROCOPY RESOLUTION TEST CHART



CARIES OF THE SPINE. (See [illegible])

CELLULITIS. [illegible]

[illegible]

[illegible]

CEREBELLAR ABSCESS. (See Intracranial Complications of [illegible])

CEREBRAL ABSCESS. (See Intracranial Complications of [illegible])

CEREBRAL EMBOLISM, HAEMORRHAGE, AND THROMBOSIS. (See [illegible])

CEREBRAL TUMOUR, MEDICAL. (See also Cerebral [illegible])

[illegible]

[illegible]

[illegible]

[illegible] still in the stage of cellular proliferation and without degenerative or [illegible] In the latter case a gumma will resist even the most [illegible]

Intercurrent complications, rather than direct intracranial pressure by the tumour itself, may be the cause of death. Thus, respiratory complications are not uncommon, especially in the form of inhalation-pneumonia; or a patient with a tuberculoma may have fulminating meningitis [illegible] die from miliary tuberculosis.

Purves Stewart.

CEREBRAL TUMOUR, SURGICAL. (*See also* CEREBRAL TUMOUR, MEDICAL). Two recent publications have thrown a great light upon the [illegible] of operation for this condition; these are the report by Tooth of the figures for the National Hospital, Queen Square, and von Eiselsberg's account of the Vienna cases.

Prognosis apart from Operation. In the main, of course, the [illegible] and the great majority of cases, after intolerable headache, blindness, mental impairment, various forms of [illegible] in the course of six months to five years. But to this generalization there are important exceptions. The [illegible] is much longer than that described. Many cases are on record in which symptoms of tumour lasted for [illegible] Tooth, for instance, has found amongst the patients with cerebral tumour discharged from the National Hospital in Queen Square, London, fifty-one who were not operated on, but have survived on an average, about seven years. About seventy others did not reply, and many are probably dead. In estimating the prognosis, therefore, the length of time that has elapsed since symptoms were first noticed, up to the date of examination, is very important.

The location also is important. Tumours below the tentorium are always liable to cause sudden death by blocking the foramen magnum. Many cerebellar 'tumours' in children are tuberculous, and may lead to fatal tuberculous meningitis at any time. On the other hand, in adults tumours of the cerebello-pontine angle and of the cerebellum may be innocent; and Tooth reports eighteen cases living, on an average, six years after the onset of symptoms.

With reference to the possibility of cure, it is of course feasible to [illegible] by early and efficient treatment with mercury and iodides. But there is a tendency to relapse, perhaps in some other part of the nervous system, and the scar may lead to paralysis, loss of [illegible], or epilepsy.

Apart from these cases, there are a fair number of instances known [illegible] symptoms apparently diagnostic of cerebral tumour, have ceased to advance, or even more or less completely disappeared. Some of these were probably cases of serous meningitis (Osler), and [illegible] may arise in connection with growths of the spinal [illegible]

The prognosis in individual cases must be founded principally upon

[illegible] rate of progress of the complaints up to the time of examination [illegible] the diagnosis as to the exact nature and location of the growth. [illegible] of urgency calling for operation. If there is to be special [illegible] [illegible], the usually more or less transitory or epileptic [illegible] [illegible] distress, drowsiness, restlessness and intracranial [illegible].

Prognosis when treated by Operation. It is only a minority of [illegible] that are suitable for any attempt at radical removal. Brain [illegible] usually attack 50 out of 100 cases seen by him, and only three [illegible] of these were permanently cured. At the National Hospital [illegible] Paralysis and Epilepsy, out of 197 patients with cerebral tumour [illegible] 111 were treated by removal of the tumour, about a fifth. [illegible] these series would probably include cases not up specially for [illegible] the proportion amenable to surgical removal [illegible] may be even less.

Operative Mortality. Three operations have to be considered: [illegible] decompression, exploration and removal of the tumour.

Decompression. The mortality of this procedure is not to be [illegible] In von Eiselsberg's series, 6 out of 28 died within a month; [illegible] Queen Square, 29 out of 80 were lost in the same length of time. [illegible] patients survives, the results are usually very satisfactory, [illegible] where there is a real rise of intracranial pressure, both in relieving [illegible] headache and in saving the sight. Cerebral hernia may give trouble [illegible] if the skull is opened. The eventual fatality from the [illegible] growth of the tumour cannot, of course, be averted, though it may be postponed.

Exploration. The mortality of exploration at Queen Square was [illegible], 25 out of 74 dying within a month; in von Eiselsberg's [illegible] 16 died out of 35. The death-rate then is about 40 per [illegible].

Removal of the Growth. In the Queen Square series, 31 out of [illegible] died within a month; and in Vienna, 25 out of 100, so [illegible] the mortality is about 25 per cent. The danger is least with [illegible] of the cortex, and greatest with those of the cerebello-pontine [illegible] in the latter case, more than half die. The causes of death [illegible] shock, cardiac or respiratory failure, which may come on a week [illegible] after the operation, septic meningitis, and occasionally pneumonia. Most of the extirpations call in von Eiselsberg's cases were [illegible] in two stages. Of 168 cases at Vienna, 17 died as a result of the first stage.

Ultimate results. Turning next to the ultimate results of operation, it will be seen that about a third of the cases at Queen Square, treated by extirpation of the growth, were alive and well some months or [illegible] afterwards, but by no means all these were free from danger of [illegible]. In von Eiselsberg's series, of 168 cases operated on, only [illegible] are described as cured, and 23 as improved, giving a total of only [illegible] out of the whole. Kuttner's series is mainly [illegible], [illegible] cases of hydrocephalus and serous meningitis are included.

[illegible]	95	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	85	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	74	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	49	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	40	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	197	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]	41	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	0	1	0	1
[illegible]	3	[illegible]	[illegible]	1	[illegible]	1	0	0	0
[illegible]	6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	23	[illegible]	[illegible]	[illegible]	[illegible]	0	2	2	1
[illegible]	16	[illegible]	[illegible]	[illegible]	[illegible]	0	12	0	0
[illegible]	5	[illegible]	[illegible]	[illegible]	[illegible]	0	0	1	0
[illegible]	3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	0	0
[illegible]	3	[illegible]	[illegible]	[illegible]	[illegible]	0	0	1	0
[illegible]	9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	12	[illegible]	[illegible]	[illegible]	[illegible]	0	2	0	0
[illegible]	11	[illegible]	[illegible]	[illegible]	[illegible]	1	0	0	0
[illegible]	4	[illegible]	[illegible]	[illegible]	[illegible]	2	0	0	1
[illegible]	2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

III.—*Kuttner's Series* (1907–1912).

Total operations, 72; mortality [illegible] 6·5 per cent.; tumour removed [illegible] in 22 cases. Of the 22 patients, 9 were alive three to [illegible] after operation; 5 one to two years after; 4 two to [illegible] years after; 2, three to four years after; and 2 four to five years.

[illegible] *Results.*—Of 22 cases, 10 [illegible] 75 per cent.

[illegible] be remembered, however, that comparable [illegible] were [illegible] to cases that were not to agree. Innocent [illegible] of course, show far better results than the commoner [illegible] and gliomata, which almost always recur. It is [illegible] expected, all be successful if the surgeon has progressed before operation. Tooth, on the authority of the Queen [illegible] advises that the surgeon should not attempt to remove [illegible] diffuse growths, probably [illegible] or cystic degenerating gliomata, which become [illegible] interfered with. Nor should he attack [illegible] exception that cysts may be tapped. In the patient survives [illegible] operation, the best results are obtained in cases of tumours of the [illegible] cerebellum angle, which are usually innocent. Allen Starr finds [illegible] in the literature of 69 cases cured up to three months, but [illegible] operated on; 1 was well after twelve years. Glioma of the [illegible] exceedingly likely to return; only one of the London cases was apparently cured.

Unfortunately, after the removal of tumours of the cortex, patients may be left with hemiplegia, aphasia, or mental impairment, if the motor or speech centres were involved.

Summing up, we find that only about a fifth of the cases diagnosed [illegible] cerebral tumour are suitable for removal; that a fourth of these [illegible] probably die of the operation; that another fourth will be greatly [illegible], or cured; whilst the remaining half will not be improved, or will die of recurrence. Thus, of 100 cases, 20 are extirpated, 5 die of the operation, 5 are improved or cured.

Nevertheless, the headache and loss of sight are so distressing that von Eiselsberg quotes Horsley with approval in the dictum that "it is inhuman not to operate on a patient with cerebral tumour [illegible] decompression, at least, is possible."

[illegible] Tooth, *Rev. of N. [illegible] Lancet, Med. Chirg. Soc. [illegible]* 1914, April, 487; Von Eiselsberg, [illegible] Rev. [illegible] 1913, Sept., 309; Kuttner, *Rev. de Chir.* 1913, 646.

A. *Bowlby Shaw.*

CERVICAL RIB.—In many cases a cervical rib gives rise to no trouble at all; this must be so, because, though the condition is usually bilateral, the symptoms are almost invariably unilateral. There are [illegible] sorts of sufferers: those with pressure on nerve roots, causing

[illegible]

Effects of Removal. [illegible] Personally, I use a posterior incision, which is easy, and I think safer.

End-results. These are fairly satisfactory, but not invariably so. The writer has seen [illegible] operated on three times by various surgeons [illegible] approved. Of the 21 cases in Hospital [illegible] 2 were no better. Second had 1 done in 29 cases. In Hospital 29 [illegible] part was [illegible] and injury [illegible] 1 [illegible] alternate testis.

Stranding [illegible] up the results as follows: 77 per cent are cured. 15 per cent improved. 10 per cent not improved. Sometimes it is several months before the benefit is felt.

Reference: [illegible] *Proc. Roy. Soc. Med.* 1913, [illegible] Series, 113; [illegible] *Lancet*, Mar. 1904, [illegible] 22; Stromeyer, *Lehrbuch Chir. Orthop.* 1913, [illegible] 280.

A. Rendle Short.

CHARCOT'S JOINTS. There is, of course, no prospect of cure in these cases but with care the joints may settle down and remain so for [illegible] years. The writer has seen some excellent results following excision in suitable cases, but this is not lightly to be undertaken, as there is a considerable danger of suppuration or of non-union.

A. Rendle Short.

CHEST, GUNSHOT WOUNDS OF.—(*See* GUNSHOT WOUNDS.)

CHICKEN-POX. This is a disease which is but occasionally fatal, and one in which complications but seldom occur. During the eleven months, Feb. 7, 1902, to Jan. 6, 1903, 25,009 cases of chicken-pox were notified in London. There were therefore probably about 27,280 cases during the year 1902. During that year 32 deaths from chicken-pox were registered. Probably in not all of the cases was death strictly due to that disease. But even if it were, the fatality was only 0·11 per cent. Of some hundreds of cases which have come under my observation, I have met with three in which death took place. In one case a child of ten months, there were laryngeal complications, presumably due to vesicles in the larynx, which necessitated tracheotomy; the wound became septic, and fatal bronchopneumonia supervened. The second case was one of varicella bullosa in a child aged one year. The third was a case of so-called varicella gangrenosa, also in a child aged one year. Varicella haemorrhagica is invariably, and varicella bullosa occasionally, fatal. But both of

[illegible] of the disease, especially the [illegible] and [illegible] gangrenous, which is a complication rather [illegible] [illegible] common, and is occasionally fatal, usually through [illegible] complication. The prognosis depends on the number of [illegible] become gangrenous and the age and physical condition of the patient. Should the larynx be invaded by the ulceration, [illegible] tracheotomy may be necessary, and this is an operation which is always attended by some risk, as in the case mentioned [illegible].

(J. H. [illegible])

CHOLECYSTITIS. Cholecystitis [illegible] cholelithiasis.

Acute Suppurative Cholecystitis. The [illegible] is a sequel of a gall-stone [illegible] the [illegible] case.

In the [illegible] cases there are reports in the literature of 24 [illegible] Ichorrhoeic cases are rare and should [illegible]. The prognosis depends entirely on early diagnosis and [illegible] thus the majority recover [illegible] of

Cholecystitis without Gall-stones but causing Similar Symptoms. [illegible] means rare, and many of the patients are operated [illegible] under the mistaken supposition that stones will be found. [illegible] Stanton, of 98 such cases 46 were cured, 10 much better, [illegible] better, and 19 no better. These results are not nearly as [illegible] ordinary gall-stone cases.

Empyema of the Gall-bladder. This is usually due to impaction [illegible] in the cystic duct, followed by infection. If an operation [illegible] early, the great majority do well after cholecystectomy.

Cholecystitis with Gall-stones. (See article on GALL-STONES.) [illegible] infection greatly increases the risk of the operation for gall [illegible] the Bristol Royal Infirmary 2 out of 9 such cases died [illegible] the Mayos' series 10 out of 61. The end-results are also less [illegible].

[illegible] Stockton, *Jour. Amer. Med. Assoc.* 1911, lvi, 441; Mayo, [illegible] 1906, xliv, 209; Rendle Short, *Bristol Med.-Chir. Jour.* 191[illegible], [illegible]

(J. *Rendle Short*.)

CHOLELITHIASIS. (*See* GALL-STONES.)

CHLOROSIS. In the average case of chlorosis, complete recovery [illegible] confidently be expected in from six weeks to four months.

The greatest obstacle in the way of absolute cure is failure of the [illegible] to persist with the necessary treatment. Symptoms disappear, and the patient's sense of well-being is so greatly increased that [illegible] to realize that complete health has not been regained. It [illegible] cannot be too strongly insisted upon that the absence of [illegible] the patient's subjective sensations, or an appearance of health,

Factors affecting Prognosis.

Age.—[illegible]

Heredity.—[illegible]

[illegible]

[illegible]

Effect of Treatment. Diabetes is not one of the diseases in which [illegible] through the choice of alternative lines of treatment [illegible] in the way, but the main indication is quite [illegible] indication is the adequate administration of insulin [illegible] which may arise are the persistence of hunger, coma [illegible] or disturbance of the patient to take a [illegible] carbohydrates, largely in the form of sweets [illegible] prescribed to treat.

[illegible] a speedy restoration to health cannot be [illegible] the patient is confined to bed. It is [illegible] percentage is well above that figure, and if we are asked [illegible] patient will be kept there, we may say three weeks.

Complications.

Intercurrent Affections. [illegible]

CHOLERA. [illegible]

Indian patients over 50 years of age, among whom under the former treatment [illegible] more than 75.7 per cent. Fatal uræmia being especially frequent in the later decades. In Europeans and in Chinese (Duncan Whyte), the death-rate does not rise so rapidly with the age. On the admission of a patient the blood-pressure and specific gravity of the blood afford the best indications of the severity of the case. [illegible] at the wrist and specific gravities of 1066 and over (1056 being the normal), indicating very great loss of fluid from the body, are always grave, although under the present treatment 70 per cent of them recover. Other serious signs are rapid respirations, such as forty or more per minute, cyanosis, great restlessness, [illegible] temperature down to below 97°. Rapid and repeated [illegible] collapse after hypertonic injections, collapse without the specific gravity of the blood being increased (indicating previous abundant [illegible] of large quantities of watery fluid), and a blood pressure persistently below 80 to 90 mm. are all grave signs in the [illegible] stage.

In the *reaction stage*, which older writers regarded as at least as deadly as the collapse stage, the chief dangers are severe febrile reaction, [illegible], suppression of urine. In the pre-transfusion days, patients in the Calcutta European Hospital whose temperature rose during the reaction with returning pulse to from 103° to 106° [illegible] After hypertonic saline hyperpyrexia may occur, especially in hot damp weather, and if the temperature is not reduced before the patient becomes unconscious, death always results, although it is usually preventable by timely measures to reduce the fever. Much more frequent and serious is continued suppression of urine, causing uræmia, occurring either in very severe cases with repeated collapse or in comparatively mild ones not coming under skilled treatment until two or more days after the onset of the disease and already suffering from anuria for a day or more on admission. If suppression of urine has lasted for two or more days the prognosis is exceedingly grave, especially if the specific gravity of the blood is not increased, showing little loss of fluid. With the hypertonic saline treatment the death-rate from uræmia was 11 per cent among 592 cases; but recently the addition of 2 per cent [illegible] to the saline transfusions has reduced it to about [illegible] rate in Calcutta, while Sellards had previously [illegible] deaths by the same measure in the Philippines.

Complications. Pneumonia is a serious late complication, with a [illegible] mortality; but in Calcutta it is only responsible for 2 per cent of the mortality in cholera, although more frequent in colder climates. Sudden cardiac failure of apparently convalescent patients, due to too early and sudden sitting up in bed, accounted for [illegible] per cent of the deaths. Septic complications are predisposed to by the low state of cholera patients, especially if acidosis is present, but the [illegible] incidence. Cholecystitis

[illegible] tonsils occurs in about 2 per cent. but as very early [illegible] suspicious pneumonia is seen in 1 per cent of cases. [illegible] to early [illegible] though it may produce death [illegible] in very exhausted patients. The prognosis is much [illegible] cases and in [illegible] smokers (Duncan Whyte [illegible] to gain to [illegible]

Leonard Rogers.

CHOREA. The prognosis is mainly concerned with childhood [illegible] the occurrence of chorea in adolescence and in adult life [illegible] recognized.

[illegible] to notice in the out-patient department the many [illegible] that rheumatic children show when they are first brought [illegible] and the result gives a rough practical idea of the relative [illegible] of the important ones.

[illegible] 500 cases 248 suffered from arthritis and arthritic pains [illegible] nodules cordis 215 from chorea, 137 from sore throat and [illegible] nodules.

[illegible] be added that all cases of chorea were looked upon as [illegible] or probably on the safe side.

[illegible] though more frequent in the female: of 284 consecutive [illegible] 202 were females and 82 were males.

[illegible] is very seldom directly fatal in childhood. Of [illegible] children that the writer has seen, only 2 have died from [illegible] of the movements, though some others have been des[illegible] This experience is confirmed by the recent statistics of [illegible] 296 cases of chorea saw only 1 case fatal from the violent [illegible] So far then, as the first problem in prognosis, the [illegible] the particular attack, we may with confidence feel that [illegible] warning, let it be added not to overstrung these patients. [illegible] of an attack is most uncertain. We may collect [illegible] and arrive at some such average time as six to eight weeks, [illegible] average to a particular case is as likely as not to [illegible] Abt found that the time in hospital on average [illegible] from six to eight weeks.

[illegible] to relapse is great, and there is a group of cases which [illegible] annually a fresh attack over a period of years. Of [illegible] the fact that these attacks seem to come on almost [illegible] With regard to this entire question of recurrence in [illegible] is remarkable how persistently an obvious event is [illegible] an explanation for the occurrence: not who of us, with [illegible] from tuberculosis, would expect to find a clear-cut [illegible] every fighting against that infection? Why should not [illegible] infection be dormant in the system, as undoubtedly [illegible] bacillus does, and light up again under circumstances of [illegible] which we cannot definitely ascertain?

[illegible] of chorea is intimately bound up with that of heart [illegible] 247 consecutive cases showed obvious signs of organic [illegible] 122. Two points will, however, be emphasized here.

Firstly, that frequent chorea [illegible] for the development of mental [illegible] very [illegible] where there is [illegible].

When [illegible] chorea develops at the height of [illegible] fatal issue is frequent. In 20 fatal cases of [illegible] in which chorea was a prominent symptom [illegible] and in [illegible].

There [illegible] examples of chorea [illegible] although the improvement [illegible] that it is difficult to [illegible] when the recovery occurs.

The mental condition in some of these cases is considerably altered, and the writer has known several [illegible] defective. Children with chorea [illegible] emotional [illegible] there is no doubt that the standard of intelligence in the worst chorea cases is much lowered, and very possibly permanently damaged. As a rule, in ordinary cases, the intelligence is good, although the mental balance is always weak in the children who are the victims of severe chorea, and in rare cases with an unsatisfactory mental history in the family there may be for many months a condition of mind which is so near to alienation as to give rise to considerable anxiety.

We must remember that there are rare cases of tuberculous meningitis in which movements indistinguishable from rheumatic chorea occur; the prognosis in such is, of course, hopeless.

Mental delusions and hallucinations that occur in some cases pass away, as does also dumbness.

In adult life the preponderance of cases in the female still holds good, and the disease is more severe and often more fatal, although such an event is decidedly rare. The Guy's records quoted by Herbert French show 5 deaths in 29 consecutive cases, a much higher proportion than occurs in childhood. The mental changes in the adult are likely to be more prominent than in the child, and may result in an actual dementia lasting for a considerable time, and some of these patients are indeed very close to the border of insanity.

It must be remembered that chorea may sometimes begin at a very early age. The writer has had three cases in which the condition developed under three years of age. In all [illegible] a point of great practical importance.

The duration of an attack depends to some extent upon the mode of onset. The most acute cases [illegible] months.

[illegible] believes that a point of considerable importance in the [illegible] of chorea, upon which more information is needed, is the [illegible] of present educational methods. He looks upon chorea [illegible] neuropsychopathic, and, if this is correct, it is evident that [illegible] necessarily based upon the assumption of [illegible] that cause an increase of [illegible] in cases of incipient chorea [illegible] problem is a difficult one. But it is clear that many [illegible] the poor attend school in a state of ill health or [illegible] children who [illegible] the weekly [illegible] [illegible] to a special [illegible] class [illegible] exception.

[illegible] the prognosis. [illegible] [illegible] the method [illegible] [illegible] has not been discovered which promises a [illegible] cure. On the other hand, the prognosis may be made [illegible] by reckless treatment. Several general [illegible] [illegible] to the burden of the illness [illegible] from overdosage with chloral are tragic events, but not [illegible] happenings. Chloroform may produce alarming symptoms [illegible] if given unauthorizedly, but the intoxication is a [illegible] and to this extent has little effect upon the prognosis.

So far as the writer can ascertain, a good deal will depend, in the [illegible] prognosis, upon the adaptation of the line of treatment to the [illegible] and to the phase of the illness. Exceedingly severe [illegible] and emotional storms, if treated with arsenic, will not [illegible] that are assisted by nerve sedatives. A combination of the [illegible] bromides seems helpful in early rheumatic cases [illegible] recovery when the temperature is normal but the nervous [illegible] exhaustively unstable. Rest and absolute quiet—undisturbed in the early stages—are often towards the end of a long case [illegible] by cheerful, sensible company and orderly exercises.

[illegible] and W. H. Mayer have stated that they have obtained [illegible] results with the intravenous injection of ten centigrammes [illegible] phenol solution, repeated daily for three days. There is [illegible] present sufficient evidence upon this method to enable one to [illegible] alteration in the general prognosis. *[illegible]*

CHORION-EPITHELIOMA. No type of malignant disease [illegible] present more marked variation in respect of its malignancy [illegible] death has followed growth and the performance [illegible] operation within the month, while on the other hand, in [illegible] where operation has been delayed for more than a year [illegible] phenomena indicative of malignancy have occurred yet the patient [illegible] saved. Even when metastases have been left behind at the [illegible] operation, recovery has taken place in a few cases. Cases [illegible] in which spontaneous cure has occurred, where [illegible] has rested upon the presence of original nodules and masses [illegible] in the uterine veins, which have been subjected to careful [illegible] examination.

There is some evidence which suggests that cases following vesicular mole are less virulent than other forms. As the presence of hydatid mole has in many instances acted as a danger signal, it is likely that an ensuing chorion-epithelioma will be attacked at an earlier stage than a growth following upon normal pregnancy or abortion. Further, the extreme difficulty of deciding when a hydatid mole has taken on a malignant character will often lead to radical operation earlier than absolutely necessary. All investigators are agreed as to the impossibility of deciding in border-line cases, and clinical observation and symptoms must be considered in forming an opinion.

Teacher[1] gives the following results in cases collected by him in the literature: Of 99 cases operated on, 11·1 per cent died within a few days. Of 63 cases operated on, 13, or 20·6 per cent, were in good health and free from recurrence two years later. Two years may safely be taken as indicating a complete cure in these cases.

Sepsis, or general dissemination, is the final stage in the disease; but cases which were known to have had abdominal metastases and later to have had haemoptysis, suggesting the presence of deposits in the lungs, have yet in rare instances been recorded as recovering.

Chorion-epithelioma of the Fallopian Tube.—The cases which appear to have originated in the Fallopian tube are, as might be expected, more serious than in the case of the uterus. In the first place the difficulty, almost the impossibility, of diagnosis, and in the next place the early dissemination which occurs, both militate against a favourable outlook.

Bazy[2] has collected 12 cases, with the following results: 2, not operated on, died; of the other 10, who were operated on, 5 died soon after operation, 4 lived from two to four months, 1 was cured. In one case the growth was only the size of an early tubal gestation, for which indeed it was mistaken at the time of operation; nevertheless the patient died in a few weeks with extensive metastases. In contrast to this is a case recorded by Phillips[3] who removed a chorion-epithelioma of the left tube, and later operated for metastases, removing the uterus and right appendage, but leaving behind a mass at the root of the mesentery which he took to be metastases in glands; yet the patient recovered and was well two and a half years later.

References. [1] *Allbutt's System of Gynaecology*, 1909, 407; [2] *Ann. de Gyn. et d'Obst.* 1913, April; [3] *Amer. Obst. and Gyn.* 1911, ii, 299.

Bryden Glendinning.

CIRRHOSIS. (*See* Liver.)

CLEFT PALATE. In spite of the publication of several very important [illegible] of cases well followed through and treated by various methods, we are still without reliable information on some necessary points. It would be very valuable, for instance, to have data for judging the mortality amongst cleft-palate babies in the early years of life, before the age at which it has been customary to operate. Sir Arbuthnot Lane claims that many lives are saved by closing the

[illegible] during the first few weeks after birth, because so many of these [illegible] would otherwise die, but this opinion is unsupported by [illegible] and is open to grave doubt.

Further, we do not know whether children, whose palates have been [illegible] by a flap-operation, will eventually be able to speak well. At the exhibition of cases treated by various methods at the Royal [illegible] of Medicine in 1911, very few of those shown by the advocates [illegible] procedure were old enough to talk, and their mouths showed [illegible] deal of scarring in many cases, so that it was open to question [illegible] very essential mobility of the soft palate would be obtained.

On other points, however, we are now in possession of very excellent [illegible]. Four methods of treatment come up for discussion: (1) *Langen*[illegible] [illegible] the ordinary operation; (2) *Lane's* turn-over flap method; [illegible] *Brophy's* operation; and (4) the *Obturator* [illegible].

1. **Langenbeck's Operation.** Provided that care is exercised in [illegible] time of operation, so that the child is in good health [illegible] it is performed, the immediate danger to life in patients two [illegible] of age or older, is extremely small. Berry reports 154 cases [illegible] death.

The prospect of *closure of the gap* is good. Berry says that he has [illegible] a cleft which could not be closed by operation, provided [illegible] parts had not been spoiled by a previous failure. In his list [illegible] first operations, there were 109 in which complete union took [illegible] the hole left was only big enough to admit a probe and would [illegible] close spontaneously. In 25 cases success was partial or a [illegible] ined; some of these were cured by a second operation. In [illegible] was complete failure; some of these also were remedied [illegible] It must be admitted that not many surgeons could [illegible] so high a percentage of successes.

[illegible] operations gave 13 successes and 3 partial successes.

[illegible] nd-results as regards *speech* depend on many factors: the age [illegible] ation, the length and mobility of the soft palate, the intelligence [illegible] child, and the care in after-training. In Berry's tables, the [illegible] was investigated at least a year later in 97 cases; it is described [illegible] in 36, good, but certain letters still gave trouble, in 21, and [illegible] poor in 40; in many of these last there was very definite [illegible] nt, others were mentally defective, and the great majority [illegible] proper trainin[illegible].

LANGENBECK'S OPERATION (BERRY).

[illegible]	138	0	109	25	4	36	21	40
[illegible]	16	0	13	3	0	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

2. **Lane's Flap Operation.** [illegible] Lane [illegible]

[illegible]

Lane [illegible]	369	22	[illegible]
[illegible]	144	18	12 [illegible]
[illegible]	57		
[illegible]	38	[illegible]	[illegible]

3. **Brophy's Operation.** [illegible]

4. **The Obturator.** [illegible]

[illegible] controllable [illegible] [illegible] speech [illegible] [illegible]. The obturator is [illegible] in adults than in [illegible] who would require frequent changes and might [illegible] it [illegible] the oesophagus.

[illegible] Berry [illegible] *Med. Lond.* [illegible] *Ophth. Proc.* 1912. [illegible] Mod. 1911 [illegible] *Ophthalmoscope* 1911. [illegible] *Brit. Med. Jour.* [illegible] 11, 229. [illegible] *Brunton* [illegible].

CLUB-FOOT. (*See* TALIPES.)

COLITIS.

Simple. The prognosis is, as a rule, good, provided the condition [illegible] in hand early. When very exceptionally acute, death [illegible] from exhaustion, toxaemia, or collapse.

Membranous. This disease is, as a rule, chronic; however, the [illegible]ity of patients eventually recover, though some do not appear [illegible] benefited by treatment. The outlook is better in men than in [illegible]. The complaint is not in itself fatal. The age of the patient [illegible] influence on the course of the illness, nor has the presence [illegible] intestinal sand, which is not uncommon.

Ulcerative. The outlook is exceedingly serious if the disease is in [illegible] severe, many of the patients dying within the course of the [illegible] months after presenting themselves for treatment. Grave [illegible] are high fever, marked distention due to flatus, severe [illegible] copious diarrhœa, exhaustion, and, more rarely, peri-[illegible]. Death may take place in three or four days from the first [illegible] symptoms, and frequently occurs within the first two months. [illegible] however, be remembered that many of these patients give [illegible]ry of previous attacks of diarrhœa, and if the onset of the [illegible] measured from the first of these, the duration is often many [illegible]. On the other hand, life may be prolonged with continuous [illegible]ate symptoms for upwards of two years, and in a small propor-[illegible] cases permanent cure apparently results from treatment, even [illegible] the disease has been very acute and severe. The vast majority [illegible] run their course either to death or recovery without complica[illegible]. Though perforative peritonitis may occur, it is much less [illegible] than might be supposed when the extensive area of ulcerated [illegible] taken into account. Hepatic abscess is very rare indeed [illegible]ary embolism sometimes kills. In cases which recover, the [illegible]bility to obstruction of the bowels from cicatrization.

[illegible] mortality is higher than in tropical dysentery; thus, death [illegible] in 40 out of 55 cases treated at Guy's Hospital; 28 out of [illegible] St. Bartholomew's; 9 out of 19 at St. George's; 8 out of 19 [illegible] Mary's; 40 out of 80 at St. Thomas's.

[illegible] death in the St. Thomas's Hospital series was as [illegible]. Of 8 children, all died from exhaustion following diarrhœa. [illegible] 42 adults, 9 died from exhaustion following diarrhœa; 1 from [illegible]age; 8 from haemorrhage and diarrhœa; 1 from hepatic abscess; 6 from peritonitis after perforation; 2 from peritonitis

without perforation [illegible] from pericardial effusion, closure of an artificial anus.

At the present time there is not sufficient evidence upon which to base a prognosis from the physical examination, present in the examination of [illegible] and [illegible] tests. [illegible] the patient does not influence the outcome.

It is questionable whether the use of vaccines materially modifies the prognosis. Improvement and sometimes cure have followed their use at times [illegible] but they have frequently no effect in arresting the course of the disease or preventing a fatal termination.

Tropical Bacillary Dysentery (*See also* DYSENTERY).—This disease varies [illegible] greatly in its severity. Mild cases are rapidly cured and the prognosis is extremely good. The severity of the early symptoms [illegible] an important guide. The mortality of epidemics of average severity, such as those which occur in Japan, is about 30 per cent. Convalescence is very liable to be slow, and a relapse of the symptoms is not uncommon. A great deal depends on the time at which the illness first comes under treatment, for if taken in hand early the prognosis is good, while if neglected in the earlier stages it is very liable to become chronic, with a poor outlook. A very guarded prognosis must be given if the temperature remains elevated. The presence of a leucocytosis is uncommon, but even if it occurs in any given case, it does not necessarily involve a bad prognosis. The choleraic form of acute bacillary dysentery is usually fatal, but the prognosis appears to be decidedly improved since the introduction of the use of the intravenous hypertonic solution of Leonard Rogers (i.e., sodium chloride 120 gr., potassium chloride 6 gr., calcium chloride 4 gr., to a pint of water), combined with rectal injection of calcium permanganate (5 gr. to the pint).

The chronic form generally gets well or ends fatally in the course of a few months, but may last for several years with relapses. A retracted abdomen, gross anæmia, emaciation, exhaustion, œdema of the extremities [illegible] are all bad signs. In rare cases the patient may succumb to haemorrhage. Perforation, peritonitis, and hepatic abscess are very uncommon. Leonard Rogers says that in 125 post-mortem examinations on dysenteric cases in Calcutta, no case of portal pyæmia or serious hepatic complication was found in any of the bacillary cases, which numbered 36 per cent of the whole. He also points out that the mortality from bacillary dysentery among the Mecca pilgrims, which in 1909 was 64·4 per cent, was reduced by serum treatment in 1910 to 10·8 per cent.

The more frequent use of a Shiga, Flexner, or polyvalent anti-dysenteric serum promises to improve the outlook still further. Unfortunately the same cannot as yet be claimed for vaccine treatment.

Leonard Rogers gives the following figures of the case mortality in India from 1906 to 1910: British army, 2·93 per cent; Indian army, 0·51 per cent; Indian gaols, 5·29 per cent.

sprue. The prognosis is very unsatisfactory unless the patient [illegible] recognized remedy has any very great [illegible] of the [illegible] [illegible] of the liver, and emaciation. Many [illegible] cases succumb within eight to twelve months of [illegible] but if they survive this period they tend [illegible] very [illegible] condition [illegible] danger. The [illegible] to be better in a temperate climate. Temporary [illegible] tonics are often followed by relapses, even if the patient [illegible] apparent cure in a temperate climate.

Amœbic Dysentery.—Children suffer more [illegible] than adults, and natives of a place where amœbic dysentery [illegible] than others.

[illegible] periods of apparent improvement [illegible] sometimes occur, during which the stools become less [illegible] and tenesmus is much less marked. These periods [illegible] be followed by severe relapse of symptoms [illegible] a very [illegible] prognosis. In [illegible] fulminating cases, peritonitis from perforation, gangrene of the [illegible] post-colic abscess, or exhaustion, may kill the patient even within a week or ten days from the onset. Severe haemorrhage may occur, [illegible] cause of death. The patient must not be [illegible] out of danger because there is no fever, for many cases [illegible] without elevation of temperature. Palpable thickening of the bowel, most frequently felt over the cæcum and sigmoid and often associated with great tenderness, may be present in severe [illegible] If more widespread thickening of the bowel can be felt, the [illegible] one of the acute fulminating class, and the prognosis [illegible] the extreme. The mortality rates vary from 29 per cent. to [illegible] but much depends on the stage at which the disease [illegible] treatment, and the particular type in any given case. [illegible] dysentery may last for a year, and even then be liable to repeated relapses.

[illegible] just quoted refer to the prognosis before the introduction [illegible] emetine. The outlook appears to have been wonderfully [illegible] Leonard Rogers introduced the method of the hypodermic administration of the soluble salts of emetine. Solutions of [illegible] have also been injected with very great success into amœbic abscess cavities in liver or spleen. When no more amœbæ can be [illegible] in the stools, or not found at all owing to the closed nature of the lesion, the progress of the *leucocytosis* is most important, both [illegible] point of view of prognosis and of continuance of the treatment. Absence of leucocytosis in acute amœbic dysentery is of bad [illegible] indicating extremely feeble resistance.

In the case of a small abscess the [illegible] supposed to about a fortnight. [illegible] should be [illegible].

Liver abscess [illegible]. If, however, these are [illegible], the prognosis is [illegible], because there is [illegible] being multiple. Many of these cases [illegible] abscesses [illegible] tissue to make recovery [illegible]. [illegible] is very liable to follow [illegible] the patient if the abscess is large.

Emetine [illegible] extent the hepatic complications, and [illegible] effect if they are already present. *[illegible]*

COLON, CARCINOMA OF. — Compared with the average rate of growth of cancer elsewhere, carcinoma of the large intestine is not a particularly rapid or malignant type of the disease. It is [illegible] more favourable than cancer of the rectum. [illegible] has pointed out, and contrary to the generally received opinion, the [illegible] form, in which a large tumour can be felt, is [illegible] than the stenosing form, which causes [illegible]. The duration of life, from the first onset of symptoms to the end, is usually from six months to two years [illegible]. In the great majority of cases the eventual [illegible] acute obstruction; less often [illegible] peritonitis.

Marked anaemia and loss of [illegible] show that the end is not far off.

Results of Surgical Treatment. — The [illegible] depends very greatly on the stage of the patient when the [illegible] sees the case; also to some extent on the [illegible]. If signs of acute obstruction are [illegible] present, the outlook is very grave, and all that can be done at the [illegible]; but in a majority of cases the [illegible] to those of a subsequent radical operation. Cases with cachexia are [illegible] beyond hope of cure, [illegible] to give some relief.

It will be perfectly evident [illegible] that the two-stage operation is decidedly the safer [illegible] about 15 per cent. This refers to cases in which there is no acute obstruction present. By a two-stage operation [illegible] Paul's method, in which the growth is [illegible] each end of the bowel at the [illegible] and the [illegible] closed subsequently [illegible] followed by resection and [illegible].

The best results after the one-stage operation are from the Mayo

[illegible] operated on, or 1.3 per cent. [illegible] including the patients of the Mayo [illegible] the mortality in 209 cases is 29 per cent. [illegible] obstructive cases, the mortality [illegible]

[illegible] Operations for Carcinoma of Colon

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Two stage	142	[illegible]
[illegible]	[illegible]	14	[illegible]
[illegible]	[illegible]	30	29
[illegible]	[illegible]	32	[illegible]
[illegible]	One stage	209	29
[illegible]	[illegible]	20	[illegible]
[illegible]	[illegible]	68	[illegible]
[illegible]	[illegible]	61	[illegible]
[illegible]	Stages not specified	143	[illegible]
[illegible] Hospital	,,	58	36.5
[illegible]	,,	58	46.5
[illegible]	,,	17	[illegible]
[illegible]	,,	28	19.9

[illegible]

[illegible]'s reports refer to cases in von Mikulicz's clinic up to [illegible] to Czerny's clinic. Moynihan's tables were published [illegible]: Lindenstein's relate to the years 1907 to 1912. Very [illegible] of the series taken from the literature [illegible] Paul's cases are all from his private practice. The [illegible] published by Vouchoud relate to the years 1880 [illegible]

In 19 cases the operation was in one stage.

End-results of Operation. These are not unfavorable, provided [illegible] that there were no secondary deposits at the time of inter[illegible] that the glands were removed. Various observers report [illegible]

[illegible] of Operations for Carcinoma of Colon

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	16	9	Over three years
[illegible]	27	14	,, ,,
[illegible]	49[illegible]	9	,, ,,
		22	One to three years
[illegible]	13[illegible]	5	Over three years
		2	One to three years
[illegible]	24	6	Over three years
		8	Under three years

[illegible]

[illegible]

Palliative Operations. [illegible]

[illegible]

CONCUSSION. (*See* HEAD INJURIES.)

CONGENITAL DISLOCATION OF HIP.—See HIP.

CONGENITAL MALFORMATIONS OF THE HEART.—See HEART, CONGENITAL MALFORMATIONS OF.

CONGENITAL STENOSIS OF THE PYLORUS.—See PYLORUS, CONGENITAL STENOSIS OF.

CONTUSION OF ABDOMEN.—(*See* ABDOMEN, INJURIES.)

CONVULSIONS, INFANTILE.—(*See* INFANCY, CONVULSIONS.)

COXA VARA. Vigorous treatment the condition usually gets worse. The shortening becomes more noticeable as growth proceeds. Rarely, the tuberosity being very displaced. Hoffa had cases [illegible]

CYSTITIS. (*See* [illegible]

CYSTS, PANCREATIC. (*See* PANCREATIC [illegible]

DECIDUOMA MALIGNUM. (*See* [illegible]

DELHI BOIL. (*See* TROPICAL [illegible]

DEMENTIA.—(*See* MENTAL DISORDERS.)

DENGUE.—(*See* TROPICAL [illegible]

DIABETES INSIPIDUS.—[illegible]

Hydruria or Polyuria. [illegible]

[illegible] One of these is the withdrawal of [illegible] [illegible] water [illegible]. [illegible] between diabetes insipidus and [illegible] of the pituitary body, and the use of preparations of pituitary substance has seemed to [illegible] the disease. It is stated that [illegible] with headache and contracted [illegible] may be treated with an extract of the anterior lobe of the pituitary body; [illegible] with extract of the [illegible] lobe. [illegible] treatment is, however, [illegible] results.

Azoturia. [illegible] the continued [illegible] of [illegible] quantities of urea, the condition being usually accompanied by [illegible] and [illegible] in the [illegible] and sometimes [illegible] [illegible] [illegible] sudden death.

Phosphaturia. In [illegible] the amount of phosphates contained in the urine is increased [illegible] [illegible] The treatment is similar to that [illegible] [illegible].

[illegible] [illegible] 212 [illegible] 1911, 212. [illegible]

DIABETES MELLITUS. The true nature of diabetes and its relationship to other forms of glycosuria are still unknown, so that for practical purposes they must all be considered together. No [illegible] can be drawn between persistent glycosuria and [illegible] [illegible]

Typical Varieties

1. *Alimentary G[illegible]* [illegible]

In addition to this form of alimentary glycosuria there are [illegible]

[illegible] glycosuria which hardly amount to disease and [illegible] no danger to life or health in themselves. This [illegible] [illegible] form, but by some classed as a [illegible] glycosuria [illegible] often seen in pregnant women, whose urine may contain small quantities of sugar apart from those well [illegible] which disappears after delivery. See [illegible]. Later [illegible] that similar glycosuria is common in infants.

[illegible] cases apparently associated with disorder of the [illegible] rather to be assigned to coincident pancreatic [illegible] in alcoholic subjects. Quite large amounts of [illegible] may be passed in the urine for a considerable period of time [illegible] the supplies of intoxicants completely [illegible].

A somewhat similar incident may occur in a patient [illegible] of suitable treatment, [illegible] [illegible] [illegible] to withhold a definite opinion in regard to sugar [illegible] the patient's [illegible] has been adopted and continued for [illegible].

Glycosuria Causes Diabetes. A middle-aged man of [illegible] engrossed in business matters, short of breath and [illegible], is found to suffer from glycosuria. On [illegible] examination he of the patient cannot tolerate starch being [illegible], and a [illegible] amount of starchy materials he excretes 2 to 5 per cent of sugar, but suffers no apparent [illegible] owing to a fair age and attributes dying of combined [illegible] or atherosclerotic heart failure.

Diabetes of Moderate Severity. A middle-aged man notices that [illegible] and strength while his urine is increased in quantity [illegible] unusually thirsty. On being questioned he admits that he [illegible] well for the past year and that the symptoms have [illegible]. The urine is found to contain a moderate [illegible] sugar. On a strict diet this gradually falls in amount and [illegible] and it is ascertained that a small amount of carbohydrate [illegible] be allowed without the return of glycosuria. On a [illegible] he remains well for some months, and the glycosuria [illegible] still more limited that is necessitated. Later still, an [illegible] diabetes is found to be efficient, and the urine [illegible] a considerable quantity of sugar. The patient perhaps [illegible] of the skin on them boils and pustules. [illegible] of boils may appear in the urine, perhaps accompanied [illegible] and the patient dies comatose after an interval [illegible] years.

Diabetes. A boy aged ten to fourteen years suffers from [illegible] and one or more weaknesses, all of which [illegible] within the period of a week or ten days. Water [illegible] and drowsy, with dilated [illegible] and [illegible] breathing, and dies with that. The breath smells of [illegible] [illegible] together with acetone and diacetic acid are present. On [illegible] [illegible] [illegible]

[illegible]

[illegible]

Factors Influencing the Prognosis.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] favourably placed than the poor, who cannot afford [illegible] better, suitable foods, rest, climate therapy, and so forth. Acute rapidly fatal cases are rare among the upper classes. Cases in middle-aged persons of luxurious habits, associated with some degree of gout and obesity, often do well when these causes are eliminated by careful treatment.

Family History.—In a considerable number of cases [illegible] the patients' families have suffered from diabetes. [illegible] generally severity or otherwise of the case may be [illegible] compared to the others. [illegible] relatives can be [illegible] cases [illegible] family [illegible] mild.

Onset.—An acute onset with severe symptoms is of bad omen. [illegible] marked increase with [illegible] to a likelihood of a long course, but [illegible] Some instances which show no acute [illegible] to treatment, while mild cases may develop [illegible] however, according to von Noorden, [illegible] submit to strict regimen. Cases associated with [illegible] completely recover; they should probably be called [illegible] rather than diabetes.

Symptoms.—Great thirst and increased appetite point to [illegible] but the absence of these symptoms does not [illegible] that the affection is of mild type [illegible] loss of appetite [illegible] it has previously been large or moderate. Wasting [illegible] these cases, and it is useful to weigh the patients [illegible] as much information as to progress of [illegible] obtained; a patient who is gaining weight [illegible] Constipation is usual and may be difficult to treat, but [illegible] necessarily affect the outlook. On the other hand, diarrhoea is [illegible] and, if intractable, is often found to be a forerunner of [illegible] epigastric pain is another warning signal which should not be [illegible] Drowsiness may precede actual loss of consciousness [illegible] and should always excite alarm. The onset of [illegible] may be the first warning of the grave [illegible] which [illegible] indicated by the presence of acetone bodies in the urine [illegible] examination of the urine will always show the presence [illegible] substance in this secretion before [illegible] It may be worth noting that acetonuria may be found [illegible] children [illegible]

Urine.—The continued passage of very large quantities of [illegible] [illegible] of grave [illegible] Very large [illegible] but it cannot be said that the severity of the case [illegible] proportional to the [illegible] with other factors. Thus the sugar may [illegible] actually disappear just before the onset of [illegible]

that such an occurrence in the presence of grave symptoms is an [illegible] sign. In chronic cases the percentage of sugar and the total amount in urine [illegible]. In the presence of intercurrent infective disease [illegible] the sugar may diminish or disappear [illegible] the same. The most important consideration in connection with the sugar [illegible] is the effect of a restricted diet in reducing the quantity excreted. The usual procedure in respect to cases seen for the first time is to estimate the quantity of sugar passed for two or three days on a mixed diet and then gradually to reduce the amount of carbohydrates [illegible] such materials as cereal breakfast foods, macaroni, etc. For the ordinary mixed potatoes [illegible] taken. When all starchy food has been withdrawn the question of [illegible] to the same amount [illegible] on three successive days. If no sugar is found, then small amounts of bread or potatoes are added to the diet until sugar again appears. In this way the carbohydrate tolerance of the individual is estimated. If more than 120 grams of carbohydrates can be taken in twenty-four hours without the appearance of sugar in the urine, the case is considered mild and the patient is likely to live for many years. If on the other hand [illegible] complete [illegible] without [illegible] the disease is likely to be severe, and the restriction of the diet causes disappearance of the sugar [illegible] of which a considerable time [illegible]. It goes without saying that in all cases [illegible] with the sugar in question is [illegible] to supplement, as [illegible] by hygiene [illegible] and lead to improvement from a health point of view. If patients [illegible] fails [illegible] the presence [illegible] will indicate [illegible] in the quantity of carbohydrate in the diet [illegible] or less than it first. In most cases the sugar [illegible] tends to fall as time goes on.

The urine should be tested from time to time for the presence of acetone and diacetic acid. The Rothera test for the latter is simple and reliable, and for practical purposes [illegible] the two bodies are [illegible] together. If they are found, the aspect of the case immediately assumes a grave character, as it evidently belongs [illegible] to diabetic coma, and is likely to terminate [illegible] in a fatal issue. It must not, however, be assumed that this is invariably [illegible] to be [illegible] and disappear for considerable periods without [illegible]. Violent exercise in the exhaustion of acetone and diacetic acid is a cause for anxiety, especially if the patient [illegible] to be [illegible] in the quantity of sugar diminishes [illegible].

The appearance of any considerable amount of albumin in the urine of a diabetic [illegible] small quantities may be found from time to time in [illegible] cases without any serious effects resulting. If [illegible] of casts or pus be found, the condition is serious [illegible] the kidneys. Formation of [illegible] is [illegible]. Any increase in the urinary quantity being associated with nocturnal [illegible] is indication of approaching coma.

[illegible] in diabetics especially dry, the occurrence of a tendency to sweat has been said to be a good sign, but it would be unwise to lay stress on such a point. Pruritus seems to be more common in cases especially in gouty subjects. Boils may be troublesome, but not often of serious import. On the other hand, a severe [illegible] sometimes [illegible] complication, and [illegible] [illegible] [illegible] and [illegible].

Pigmentation of the skin in association with diabetes is [illegible] [illegible] [illegible] disease, [illegible] [illegible]. The pigment is rather dusky in [illegible] of the body, [illegible] [illegible] in those [illegible] [illegible] [illegible] a general [illegible] [illegible] [illegible]. The [illegible] [illegible] [illegible]

[illegible]

[illegible] A [illegible] [illegible] 11.7 per cent [illegible] 20 per cent [illegible] 11.8 [illegible] 21.7 [illegible]

Mode of Death. [illegible] 90 per cent [illegible]

[illegible]

[illegible]

DIARRHŒA, INFANTILE. A [illegible] diarrhœa [illegible]. In the latter condition, high fever, constant vomiting, [illegible] loss of elasticity of the skin, drowsiness, collapse, [illegible] symptoms associated with convulsions, are to be regarded with the greatest gravity.

[illegible] with collapse of alveoli and bronchopneumonia [illegible] frequently arise during the disease, rendering the outlook still more serious. If the temperature in the rectum reaches 105° the [illegible] is very bad, or if it runs up with a sudden leap from the normal to any great height. Exposure to chill during the height of the attack is very likely to produce an exacerbation of all the symptoms.

Summer Diarrhœa (Cholera Infantum). In this complaint [illegible] is based on points similar to those mentioned above [illegible]. The younger the patient [illegible] the worse the [illegible].

In the more chronic diarrhœas of children, the occurrence of œdema of the extremities is a sign of grave import, and so also is the onset of [illegible] in the mouth.

J. R. C[illegible]

DILATATION OF THE STOMACH.—(*See* STOMACH, MEDICAL AFFECTIONS OF.)

DIPHTHERIA.—The most important factors which govern the prognosis of this disease are: (1) *The age of the patient*; (2) *The site of the disease*; (3) *The severity of the attack*; (4) *The occurrence of certain complications*; (5) *The treatment*.

1. **Age of Patient.**—The following table, based on 56,507 cases of diphtheria treated in the hospitals of the Metropolitan Asylums Board during the years 1900 to 1909, shows the importance of age as a factor in the case-mortality.

FATALITY ACCORDING TO AGE.

0–1	34·0	0·[illegible]	1·[illegible]	25–30	1·[illegible]
1–2	22·[illegible]	1·10	8·[illegible]	30–35	1·[illegible]
2–[illegible]	16·1	20–1[illegible]	3·4	[illegible]–40	1·0
[illegible]–4	13·3	15–20	1·8	4[illegible]–50	[illegible]
4–[illegible]	11·2	20–25	0·[illegible]	[illegible]	10·[illegible]

From this table it appears that the disease is much more fatal in children than in adults, and that up to twenty-five years of age the younger the patient the greater is the risk to life. The fatal majority of these patients were treated with antitoxin. *Sex* appears to have no influence on the fatality.

2. **Site of the Disease.**—The most common sites are the *fauces*, *nose*, *conjunctiva*, and *larynx*. The false membrane may be found on all these parts simultaneously, or may be limited to one of them. The most intimately adherent the false membrane is to the mucous surface, the more easily will desquamation of it take place and hæmorrhage from its capillaries occur. Now the false membrane is almost invariably attached very loosely to the nasal passages and to the fauces and pharynx. Hence toxæmia is seldom pronounced and is [illegible] in nasal and laryngeal diphtheria if the fauces are unaffected, and it is the typical form of the disease which affords the most striking examples of toxæmia. Diphtheria of the conjunctiva, however, the most fatal of the three varieties under discussion, because of the continuous obstruction to respiration to which it gives rise by occlusion of the lacrimal ducts, or by [illegible].

In [illegible] the conjunctiva, the membranes may be cleared with [illegible] of the small bronchial tubes, [illegible] and thus [illegible] the patient by asphyxia. Natural [illegible], even without [illegible], [illegible] fatal. Fortunately, the [illegible] of this form of diphtheria.

Simple nasal diphtheria is seldom fatal. The most serious cases

[illegible] in which the nose, throat, and windpipe are simultaneously [illegible]

A [illegible] estimate of the influence on prognosis of the involvement of the larynx may be derived from the statistics of the Asylums Board [illegible]. During the ten years 1900 to 1909, the fatality of [illegible] in which the larynx was not affected was 8·8 per cent; where [illegible] in which it was affected (with or without involvement of the [illegible]) the fatality was 18·9 per cent.

[illegible] forms of diphtheria, the *vulval* and *cutaneous* are the [illegible] because they are prone to be accompanied by grave [illegible] diphtheria there is considerable risk of loss or impairment [illegible] damage to the eyeball.

Severity of the Attack. Most of the laryngeal cases must [illegible] severe, because of the high fatality amongst them. About [illegible] came to tracheotomy or intubation, 57·3 per cent at [illegible] Hospital, Homerton, during the ten years 1905 to 1914 [illegible] a total of 1022 cases in which the larynx was involved.

[illegible] forms of the disease, severity depends upon the [illegible]; this, in its turn, depends upon the extent and persistence of the false membrane. Albuminuria may be taken as a [illegible] the more lasting the albumin and the larger [illegible] the more profound the toxæmia and the greater the [illegible] of some untoward event. Early nephritis (blood [illegible] the urine) is a most serious condition; fortunately, it is [illegible]. The following symptoms of toxæmia are extremely grave: [illegible] vomiting; scantiness of urine; hæmorrhages into the skin [illegible] cutaneous tissue, and also from mucous membranes [illegible] only, in nasal diphtheria); an infrequent, feeble, and [illegible] pulse; an ashen hue of the lips and extreme pallor. In [illegible] in which one or more of these symptoms are present [illegible] is evidently ill, even to the unpractised eye; but [illegible] there is progressive suppression of urine, with little [illegible] he may seem to be doing well, and even to be getting better. [illegible] unfavourable symptoms are a blotchy erythematous rash, [illegible] most pronounced on the extremities; enlargement of the [illegible] convulsions.

Complications. *Paralysis* is the most frequent, as well as the [illegible] important; it occurred in about 16 per cent of the 56,507 cases [illegible] above. It usually supervenes after the false membrane [illegible], and when the patient may appear to have recovered [illegible] attack of diphtheria, commonly during the third or fourth [illegible] with diminishing frequency up to the seventh. Hence it [illegible] to know what forms of diphtheria it may follow. The [illegible] give rise to paralysis are caused by the toxin; so that [illegible] are the case, the higher the risk of palsy. In respect of [illegible] of the paralysis itself, a fatal issue is the more to be feared [illegible] the sooner it arises and the more rapidly the various [illegible] muscles are involved. The outlook is grave if any of the

[illegible]

Treatment. [illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

DISLOCATIONS. See JOINTS, INJURIES OF.

DISSEMINATED SCLEROSIS. [illegible]

DRUG HABITS (See also Mental Diseases.)

Opium

Morphine

Heroin

Cocaine

Chloral

Sulphonal

Trional, **Tetronal**

DUODENAL ULCER [illegible]

DYSENTERY [illegible]

Mortality of Bacillary Dysentery. [illegible]

[illegible]

Mortality in Amœbic Dysentery. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

DYSMENORRHŒA.

Spasmodic.—This variety is the commonest, and, as usual, very [illegible]. Great difficulty is experienced in arriving at the diagnosis of a case of spasmodic dysmenorrhœa. [illegible] upon which the diagnosis rests are [illegible] of the symptoms in the preceding chapter [illegible] the remedial element.

Severity of Symptoms.—This must be estimated not only by the expressions, but also by an attempt to fix, by other means, the degree of expression of pain peculiar to the patient.

Where the pain is severe, the usual remedies in the respective fields for a day or two with definite pauses, [illegible] a period of time to simple mechanical, on the other hand [illegible] the opium tablets, and the other hand [illegible] that is not in operation, or even simple medical attention to physical hygiene and sedative treatment, and to [illegible].

Treatment and Duration of Cure.—In the first place, [illegible] in the hypermetrotic [illegible] under [illegible] or [illegible] such as [illegible] [illegible] temporary relief. In the majority of the cases of spasmodic [illegible] treated [illegible] with a normal [illegible] with [illegible]. The [illegible] [illegible] and [illegible] [illegible] in at least 50 per cent of the cases [illegible] for a period of from one to five years. The [illegible] cases explained by faulty operations, [illegible] the [illegible] [illegible]. Other gynæcologists are agreed that the [illegible] [illegible] the [illegible] [illegible] in [illegible] [illegible] cases in which there is no physical defect, [illegible] would be the general [illegible] of the body, [illegible] patients [illegible] [illegible] exhausted and [illegible] [illegible] [illegible] [illegible] and medical measures [illegible] [illegible] [illegible]

[illegible]

[illegible]

EAR DISEASE, INTRACRANIAL COMPLICATIONS OF. [illegible] CHRONIC COMPLICATIONS OF EAR DISEASE.]

The Maternal Prognosis from the Clinical Aspect.

The Maternal Prognosis from the point of view of Treatment.

[illegible] 15 cases [illegible]. [illegible] [illegible] 20 [illegible]. [illegible] [illegible] 18 per [illegible].

[illegible] [illegible]. [illegible] 17 [illegible] 50 [illegible] 17.6 [illegible] 28 [illegible] 1908 and 1913 [illegible] better results [illegible] 18.

[illegible]

[illegible]

[illegible] treatment [illegible] [illegible] Petersen [illegible] 28 [illegible] 9 per cent.

[illegible] Leipzic Klinik [illegible] total mortality of 57.4 per cent in 91 cases [illegible] children, 21.3 per cent. Buss[illegible] gives the total mortality [illegible] as 20.97 per cent.

[illegible] Buss, [illegible] 1915 [illegible] 1911 [illegible] 1909 [illegible] 1914 [illegible] 1912.

[illegible]

ECTOPIC PREGNANCY. The prognosis depends upon: (1) *The [illegible] adopted*; (2) *The stage of advancement of the pregnancy*; and (3) *The condition of the patient when she comes under treatment.*

The Method of Treatment. It seems established beyond doubt that the best results are attained by immediate operation in all cases [illegible] the gestation has not advanced beyond the sixth month. [illegible] Hamilton Bell, investigating cases from St. Thomas's Hospital, [illegible] that many haematoceles due to ectopic gestation were completely absorbed if left alone, this is generally admitted, but the [illegible] of such a course is fraught with dangers which far outweigh the risks of surgical interference. The immediate dangers are: (1) [illegible] further and possibly fatal haemorrhage may occur; (2) That [illegible] may suppurate; (3) That the gestation may be [illegible] [illegible] implanted in the pelvis, when the surgeon will [illegible] [illegible] the problem of dealing with an ectopic pregnancy advanced [illegible] months. Further, there are the disabilities that certainly [illegible]

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

The Stage of Pregnancy. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

The Condition of the Patient when she comes under Treatment

ECZEMA AND ECZEMATOUS ERUPTIONS.

Eczema due to External Irritants.

Parasitic 'Eczema.'

'Seborrhoeic Eczema.'

Eczema of Infants.—This commonly involves the face. It [illegible] in nurslings, and is often very intractable. An essential [illegible] successful treatment is the avoidance of scratching, which

[illegible]

5. **Eczema dependent on Antecedent Conditions of the Skin.** [illegible]

[illegible]

[illegible]

6. **Eczema of Doubtful Origin.** [illegible]

[illegible]

EMPYEMA. [illegible]

Prognosis apart from Operation. [illegible] A sudden fatality is not uncommon. [illegible] patients sometimes get well. [illegible] Bursting through the chest wall [illegible]

[illegible]ognosis after Drainage Operations. [illegible]

[illegible]

Mortality after Drainage Operations

[illegible]	[illegible]	[illegible]
[illegible]	200	[illegible]
[illegible]	252	[illegible]
[illegible]	384	[illegible]
[illegible]	124	[illegible]
[illegible] Hospital	178	[illegible]
[illegible] Hospital	190	[illegible]

[illegible]

[illegible] *Bacteriology.* With reference to bacteriology, [illegible] apparently sterile pus [illegible] streptococcal [illegible] favourable [illegible] according to Lord, streptococcal [illegible]. Almost all other authorities would regard a streptococcal [illegible] as very dangerous.

Prognosis according to Bacteriology

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	31	[illegible]	[illegible]	16
[illegible]	[illegible]	45	10		[illegible]
	Lord	9	[illegible]		[illegible]
[illegible]	Lord	27			[illegible]
[illegible]	Lord	35			[illegible]
[illegible]	[illegible]	17			1

[illegible]

Double Empyema is a grave condition, but in pneumococcal cases [illegible] about half recover.

Eventual Results

ENDOCARDITIS

ENDOCARDITIS, ULCERATIVE

lamentably slender that it is not fair to hold it out as anything but a forlorn hope.

Sudden death sometimes brings this disease to a close. Of Horder's 150 cases, 19 ended in this way. Embolism or haemorrhage into the brain, or embolism of the cardiac wall, may be responsible. Tearing of a diseased cusp, indicated by sudden change in the murmurs, with aggravation of the signs of cardiac embarrassment, may accelerate death greatly.

Influence of Treatment on Prognosis.—Of this there is unfortunately little to be said. A very few cases are on record in which the application of specific remedies (autogenous vaccines and sera) has appeared to save life, so that it is perhaps fair to claim that cases in which treatment can be carried out along these lines stand a less negligible chance of cure than those in which it is not feasible.

Carey F. Coombs.

ENTERIC FEVER.—(*See* TYPHOID FEVER.)

ENTERITIS, TUBERCULOUS. Owing to the formation of adhesions, general septic peritonitis is less likely to occur in tuberculous than in other forms of ulceration of the small intestine, though this disaster is by no means unknown. Moreover, a general peritonitis may occur by organisms, e.g., *B. coli*, escaping into the general peritoneal cavity through a very much thinned intestinal wall, without actual perforation. More commonly, fistulous communications are established into other parts of the intestine, or into localized abscesses. Strictures may arise from fibrotic healing of the ulcers, but it is rare for these to give rise to subsequent intestinal obstruction. Fatal haemorrhage may occur. The ultimate prognosis depends, in the vast majority of cases, on the presence of tuberculosis elsewhere in the body. This is generally in the lungs, peritoneum, or mesenteric glands.

J. R. Charles.

EPIDIDYMITIS, TUBERCULOUS.—It is difficult and unsatisfactory, in one respect, to discuss the prognosis of an affection which is probably, in the great majority of the cases, only the most evident manifestation of an extensive involvement of the genito-urinary organs. It is obvious that the eventual outlook must usually depend more upon the state of the bladder, prostate, and kidneys, than upon the treatment of the testis. Tuberculosis of the urinary organs is discussed elsewhere. (*See* KIDNEY, TUBERCULOUS; and BLADDER, TUBERCULOUS.)

We shall here include tuberculous orchitis with epididymitis.

It has been much debated whether the epididymitis is the primary manifestation of tuberculosis in the genito-urinary organs; but favour is now inclined to be accorded to the opinion that, in most patients, the kidney, though it may show no signs itself, passes out living tubercle bacilli which invade the prostate, leading to a secondary infection of the vas, and then of the epididymis and testis. It is true that the

r, examining from the rectum, is frequently unable to feel any- in the prostate, but at autopsy this gland is always diseased; lately been declared, contrary to the general teaching, that on of the epididymis begins in the globus minor (that is, nearer prostate), not in the globus major. All this, of course, has an ant bearing on prognosis.

We have very little evidence as to the fate of a tuberculous testis itself. No doubt the majority of such cases perforate the skin d to chronic suppuration; extension of the disease will also bly take place. A few non-operated cases go on without much or even with some improvement, under treatment with lin; but there is little prospect of a cure, and great risk of ation.

Results of Operative Removal—We have to discuss the end- ts of three methods of treatment by operation: removal of the unilateral castration, and bilateral castration.

The immediate mortality after operation is very small indeed. Som ts, however, fall victims to acute general tuberculosis within a nths. The proportion is given as 5·5 per cent by Barney. depends on the surgeon's judgement in accepting or rejecting rst type of cases.

END-RESULTS OF REMOVAL OF TUBERCULOUS TESTIS OR EPIDIDYMIS.

Barney*	71	62	—	—	—	32	5·5
Von Bruns	—	46	—	—	26		
Simon	92	57·6	—	—	—	6·6	35·5
Horwitz	30	60	3	—	7	7	23·3
Bristol Royal Infirmary	16	62	6	12	12		12

For determining the end-results, we have several valuable publications to guide us; but the subject is complicated, and some of the are scanty in detail or compiled too soon after operation. Thus, Barney published in 1912 some American hospital figures; but two-thirds of his 71 cases were followed less than a year, so that f cure, 62 per cent, is high, and the after-fatalities, 5·5 per re much too few. In many points, however, his results are and valuable, as we shall see.

Von Bruns and Simon publish statistics of patients traced from pwards. The first finds 46 per cent cured by unilateral castration, and 56 per cent by bilateral castration. Simon finds 57·6 per cent cured and 35·8 per cent dying out of 92 cases. Horwitz l series, mostly followed for more than a year: 60 per

[illegible] cent cured and 23·3 per cent died. At the Bristol Royal Infirmary [illegible] cases, all followed over eighteen months, 10 were cured, 1 developed phthisis, 2 suffered from cystitis (present before operation), 2 developed tuberculosis of the other side, and 2 (including one of these last) died of pulmonary tuberculosis.

We may conclude, therefore, that when followed for several years afterwards (perhaps rather more than half the cases are cured, and about 20 per cent die of tuberculosis elsewhere. The remainder continue to suffer from various tuberculous affections, such as cystitis, prostatic abscess, phthisis, etc., which were no doubt already present at the time of operation. In Barney's series, nearly half the patients had some evidence of tuberculosis elsewhere than in the testis when first seen; in 63 per cent the prostate or vesiculæ were affected.

There is some evidence that these coincident manifestations of tuberculosis may improve after removal of the testis or epididymis. Thus, of the 63 per cent of cases with palpable nodules in the prostate or vesiculæ before operation, Barney found that 18 per cent disappeared, because 15 per cent *in statu quo*.

Recurrence in the other testis was observed in 2 out of 16 Bristol cases, in 29 per cent of von Bruns' series, and in 7 per cent of Horwitz's. It may be quite late: in one of the Bristol cases it occurred six years after the first operation.

Sexual power, according to Barney, was retained in 60 per cent of the unilateral cases, but azoospermia was present in 11 out of 13. There are, however, plenty of instances recorded, 1 in the Bristol series, in which healthy children are born afterwards. The wife and child do not appear to be infected. Even bilateral castration has no corresponding effect: if performed before puberty, it arrests the development of the secondary sexual characters.

Fatal cases die of general tuberculosis, phthisis, or uræmia from tuberculous kidneys.

Results as regards Treatment.—With reference to the effects of treatment, we have to consider unilateral castration, bilateral castration, epididymectomy, and tuberculin.

On paper, the results of *epididymectomy* are better than those of *unilateral castration*. Horwitz gives 1 out of 11 dying after the former, and 6 out of 19 after the latter. Barney also claims greater success. This merely means, of course, that less extensive cases give better results than those in which the testis is already infected, but it affords justification for the practice of leaving the testis if it appears to be uninvaded.

Double castration may be necessary, but it by no means makes a hopeless prognosis—indeed, both von Bruns and Simon claim better results in these cases than in those in which only a unilateral castration was performed.

Tuberculin appears to be of very decided value in the treatment of this and other tuberculous affections of the genito-urinary tract; but its claims rest rather on individual reports than upon statistics.

[illegible] gratulate: Rather more than half the patients get quite well: [illegible] 20 per cent die of tuberculosis elsewhere. Bilateral cases are [illegible] than unilateral in the eventual results. For early cases epididymectomy is as satisfactory as castration. The operation often leads to improvement of the prostatic nodules, if present. The prognosis in individual cases depends far more upon the tuberculosis [illegible] bladder and other organs than upon the condition of the external genitals.

References. Barney, *Boston Med. and Surg. Jour.* 1912, clxvi. 409; [illegible] *Jour. Amer. Med. Sci.* 1902, xxxviii. 1607; von Bruns, *C*[illegible] Report of Congress, 119; Simon, *ibid.* 125.

A. Rendle S[illegible]

EPILEPSY.

The Prospects of Spontaneous Cure, i.e., cure without medicinal treatment, are so small as to be almost negligible, and therefore the occurrence even of a single epileptic fit calls for an assiduous and prolonged course of treatment. One epileptic fit favours the occurrence of another, since the fit increases the instability of the cerebral cortex. In female patients, puberty and the menopause, so far from exercising a beneficial influence on the fits, as has been popularly supposed, [illegible] a contrary effect. Both of these physiological crises are [illegible] with profound disturbance of metabolic equilibrium, during which any irritability of the cerebral cortex is more likely to be increased than diminished, and, in fact, puberty is a specially common time for epileptic fits to commence. Sometimes infantile epilepsy ceases [illegible] at the age of four to five years, but this cannot be held out as a probability in any individual case. As a rule, the later in life the disease appears, the greater are the chances of spontaneous arrest. Marriage of an epileptic has no material influence on the disease, either beneficial or otherwise. Pregnancy sometimes arrests the fits temporarily, but they generally return after the pregnancy [illegible]

The Danger to Life in idiopathic epilepsy is not great, despite the alarming appearances presented by the epileptic patient during the actual fit. Status epilepticus (where one fit follows another in rapid succession without the patient recovering consciousness between [illegible] dual fits of the series) is relatively rare, but it may be fatal from exhaustion and heart failure. The chief practical risk to life is that the epileptic patient may die accidentally, during a fit—most [illegible] by drowning through falling into water, an inch or two [illegible] to prove fatal, since the fit prevents the patient from [illegible] effort to save himself. Other epileptics may die from asphyxia, by rolling over on the face in bed during an attack. Others, [illegible] blood into the air-passages, if the fit occurs during [illegible] or vomited material may be inhaled, with the same result. [illegible] are secondary 'accidents'; so also are the frequent injuries to the head and face sustained during falling, and the occasional [illegible] result from falling on to a fire. All of these 'accidents'

can be obviated only by close watching of the patient and never, under any circumstances, leaving him unobserved.

Prospects of Cure or Arrest by Treatment.—Epilepsy is one of the diseases in which medicinal treatment often succeeds in profoundly modifying the disease, either by diminishing or abolishing the attacks, or by altering the type of the paroxysms during the time that treatment is persevered with. The prognosis in any individual case depends largely upon the personal reaction of the patient to the remedies prescribed, and the assiduity with which these remedies are administered. Even where the fits do not entirely cease, treatment may sometimes enable a patient to live an active and useful life in place of an existence which is distressing to the patient himself and to those on whom he is dependent. From a series of cases observed by Gowers, the following main conclusions were drawn in regard to factors affecting the outlook:

Age. The younger the patient at the age of onset, the less is the prospect of cure. Cases beginning between the ages of ten and twenty have relatively the worst prognosis; those beginning before the age of ten are somewhat more favourable. The most favourable are those which commence after the age of twenty (with the exception already referred to, viz., that cases beginning in women at the menopause have an unfavourable prognosis).

Sex. The prognosis is slightly better in males than in females, possibly owing to the intercurrent factors of menstruation and of the menopause in the female sex.

Previous Duration of the Disease.—The shorter the duration, the brighter are the prospects of its yielding to treatment. Cases which have lasted for less than a year are the best of all; if the disease has existed for five years or less, the chances are only fair; if the fits have been occurring for more than five years, complete arrest is almost unattainable, and we usually have to be content with a mere diminution in their frequency.

Intervals between Attacks.—Severe attacks, when occurring daily, are unlikely to be arrested. Attacks occurring at intervals longer than a month have the most hopeful prospect. Attacks occurring regularly once a month, in relation to a menstrual period—whether before, during, or after each period—are relatively more difficult to arrest than those where the attacks occur at somewhat shorter, but irregular, intervals.

The Waking or Sleeping State, during which the fits habitually occur, is of importance. If the attacks occur only in the waking state and not during sleep, or only during sleep but not when awake, the prospects are three times as bright as when they occur both asleep and awake. The prognosis is rather better in pure nocturnal than in pure diurnal epilepsy.

The Major or Minor Character of the Fits has to be borne in mind. Major fits are much more easily influenced by treatment than minor fits. It is not uncommon for the minor fits to persist, in spite of treat-

[illegible] the major fits have been completely arrested. The minor [illegible] even become more frequent. Nevertheless, it is of supreme importance to persevere with treatment, since, if it be suspended, the major fits are almost certain to reappear.

Hereditary Disposition to epilepsy, contrary to expectation, does not appear to render the epileptic patient less amenable to treatment. Gowers has been strongly impressed with the frequency with which hereditary cases responded successfully to treatment.

Mental Change, whether dullness or irritability, is an unfavourable [illegible] We must bear in mind that some cases of apparent mental [illegible] epilepsy may be due to excessive bromide medication.

Occurrence of an Aura appears to render the prognosis slightly [illegible] rable; possibly because, in such cases, the patient may [illegible] trained by an effort of will to fight, during the time of [illegible] inst his threatened fit. The precise variety of aura [illegible] but slight significance in this respect.

[illegible] *Apparent Exciting Cause of the first Fit* is occasionally of im- [illegible] in regard to prognosis. Thus, I remember one case in a young medical student, in whom a first and only epileptic fit occurred [illegible] excitement of an election free-fight. The patient avoided exciting meetings thereafter, and never had another fit. I have also [illegible] ber of cases, chiefly in adolescents, in which some unusual [illegible] (e.g., salmon, ice-cream, sausage, etc.) had been consumed [illegible] mediately preceding each attack, and at no other time; [illegible] each fit was preceded by a definite attack of constipation. [illegible] of patients chiefly consisted of cases in which the fits [illegible] ng intervals of months, and even of several years. Atten- [illegible] diet and careful regulation of the bowels are of importance [illegible] epileptic patient. Frequently, however, no constant exciting [illegible] be traced, and its presence or absence does not appear very [illegible] to influence the prospect of cure.

[illegible] timate prognosis depends upon the patience and assiduity with which the patient and his friends can be induced to carry out the [illegible] nt. Treatment, dietetic, hygienic, and medicinal, must be [illegible] with for a long time after the fits have ceased. Two years [illegible] fit is commonly agreed to be the shortest period that should elapse before treatment is relaxed. Even then, the bromide should [illegible] withdrawn suddenly, but gradually, grain by grain, so as not [illegible] the brain to sudden stress.

Purves Stewart.

EPITHELIOMA OF LIP.—(*See* LIP, CANCER OF.)

EPITHELIOMA OF TONGUE.—(*See* TONGUE, CANCER OF.)

EPULIS. (*See* JAWS, TUMOURS OF.)

ERYSIPELAS. A simple attack of cutaneous erysipelas, in a [illegible] is almost free from danger. The inflammation usually lasts about a week. Recurrence is not uncommon in those cases [illegible] to be independent of a wound.

[illegible]

Exclusive cases of those occurring in infants, the aged, sufferers from Bright's disease or diabetes, or alcoholics, are of much graver import. High fever and delirium and the development of pyæmic processes point to a probable fatal result.

The mortality in 875 cases at St. Bartholomew's Hospital, a good many years ago now, was 3·5 per cent., being rather heavier in males than females. When there was delirium or pulmonary as well as erysipelas the mortality was much higher—11 per cent. in 889 cases.

A. Rendle Short.

ERYTHRÆMIA.—(*See* POLYCYTHÆMIA.)

EXOPHTHALMIC GOITRE. In this disease it will be necessary to consider the results of various forms of medical treatment; of surgical treatment; the dangers to which the patients are liable; and finally the factors that make for a good or a bad prognosis.

RESULTS OF MEDICAL AND SURGICAL TREATMENT.

	1. Hale White (hospital)	161	11	48	54	0	25	5	16
	2. [illegible]	55	0	54	64	0	17	6	13
	3. Rogers (antithyroid [illegible]	480	0	240[illegible]	30	20	0	34	16
	4. [illegible] & Eastman (quin. HBr)	56	0	56	76	0	13	11	0
	5. Williamson & Mackenzie	56	0	56	18	20	30	8	24
	6. Stoney (x rays)	48	0	41	34	54	10	0	27
	7. Porter (hot injection)	22	0	20	—	84	—	16	1**
	A. *Partial thyroidectomy*								
	1. K[illegible] (Graves's)	539	3	360*	45	0	41	8	6
	2. Kuttner	64	17	37	34	36	17	14	0
	3. [illegible] & St. Thomas's Hospitals	23	33	13	8	0	61	31	0
	4. Berry	28	1[illegible]						
	5. Walton	50	4	46	54	—	37	8	0
	6. David (Chicago Hosp.)	200	5·5	65	38	40	—	18·4	?
	B. [illegible]								
	[illegible]	225	2	115	2	48	9	31‡	9
	[illegible]								
	[illegible]	27	11	15	13	40	20	7	20

Medical Treatment.—The tables that have been published, giving total results, require examination before they can be generally accepted.

authors are over-enthusiastic on behalf of a special mode of treatment; others are meagre in details. Perhaps Hale White's results command most confidence, full particulars being given for cases based almost entirely on a communication from the patient or her medical attendant. The treatment was very diverse: digitalis, belladonna, arsenic, thymus, Moebius' serum, and [illegible] most of the private cases were ordered prolonged rest [illegible] which Hale White considers of the first importance. It must be borne in mind that the mildest cases would not be adequately [illegible] in these figures, as such would not be so likely to become [illegible] patients or to seek the consultant.

It may be observed that about 11 per cent of Hale White's hospital [illegible] died in the institution; that of those followed through, more than half recovered more or less completely, a quarter improved, a [illegible] *in statu quo*, and about 16 per cent have since died. The [illegible] cases did decidedly better, about 64 per cent recovering, while [illegible] per cent died subsequently. Most of these patients have been followed up for several years. With reference to those who died since, the mortality appears to be about double that of females of the same age.

[illegible] presents figures, without full details, illustrating the results [illegible] by the use of his antithyroid serum. No doubt rest and [illegible] must bear a share in the credit. The treatment does not [illegible] improve upon the success obtained by other methods. About [illegible] are quite cured, and one-half altogether experience great [illegible]. The percentage of those not improved is high.

[illegible] and Eastman[3] publish statistics of treatment by neutral [illegible] hydrobromide, in addition to rest and general supervision. [illegible] percentage of cases cured or greatly benefited is high; the [illegible] however, are meagre.

[illegible] collected from the practice of Williamson and Mackenzie[4] are [illegible] by the last named, a variety of methods of treatment having been followed. The results are not so good as Hale White's, only [illegible] per cent being cured and 20 per cent greatly improved, whereas the [illegible] reports about 60 per cent recovered more or less completely.

[illegible] no convincing evidence favouring any special drug treatment, but it would appear that of cases sufficiently ill to require hospital [illegible] or a specialist's opinion, about half get well or almost well [illegible] prove, about 10 per cent do not improve, and the mortality [illegible] twice the normal.

[illegible] results of *x*-ray treatment[5] compare favourably with other [illegible] the figures are rather small, and only about half of the [illegible] as 'cured' or 'almost cured' had been followed for a [illegible] year; it cannot therefore be regarded as proved that the [illegible] great advance on other treatment. In some reports they [illegible] particularly good results.

[illegible] comparatively new method is to inject each lobe with [illegible] drachms of boiling water, under local anæsthesia of the skin.

According to Porter[6] this will cure mild cases and ameliorate severe ones. He uses it as a preliminary to operation when the patient is too bad to undergo a thyroidectomy. Several injections are given at weekly intervals. Of 22 cases, 16 were more or less completely relieved, and only 3 did not improve. The others were lost sight of; one died of cancer.

Surgical Treatment. This has made far more headway on the Continent and in America than in England, where until recently it has been reserved for the worst, not to say totally unsuitable, type of cases, and is thus put to a severe test.

Three operations are in current use: complete or partial excision of the sympathetic ganglia of the neck, or section of the connecting fibres; ligature of the superior thyroid arteries; and removal of one half of the thyroid gland.

Data concerning cases of sympathectomy, followed up afterwards, and dealing only with instances of undoubted Graves's disease, are not easy to find. Boisson[7] has published a record of 15 answering to this description, of whom 2 were cured and 6 greatly improved, but it is not clear that the benefit followed very closely on the operation. Out of 27 operated on, 3 died soon afterwards. The rationale of the treatment is open to doubt, and it is said that blindness may follow.

Although the Mayos proceed to remove half the thyroid at a second operation if the first is not successful, they publish figures[8] giving the end-results of cases in which the treatment adopted has been *ligature of the superior thyroid arteries.* The details are scanty. The operation mortality was only 2 per cent. A few cases were cured; about half were greatly improved, but about a third were either not improved or had to submit to the second operation of hemithyroidectomy.

In the majority of Kocher's cases *half the gland is removed.*[9] He divides his patients into two groups: in the first there are symptoms of hyperthyroidism which are neither permanent nor progressive, associated with a parenchymatous or adenomatous goitre. Except that two patients died of pneumonia (out of 130), the results of operation were uniformly good. In the second group of 539 cases there were progressive symptoms of Graves's disease; here the mortality was 3 per cent. He lays great stress on the use of a local anæsthetic. Although the majority of the patients had been suffering long and severely, nearly half were completely cured even when watched for many years, but they often required more than one operation, the first removal having proved too limited. The cases classed as 'better' were able to earn their living; these amounted to 41 per cent.

Kuttner's[10] figures are about equally favourable, although he admits a much higher mortality (11 out of 64).

In two London hospitals, Guy's and St. Thomas's, quoted by Hale White and Mackenzie, the results are dreadfully bad, but it is probable that they represent a much severer type of case which the Continental and American surgeons would have refused to touch.

[illegible] of the patients died, and although the majority of those [illegible] were improved, several were not benefited, and only one [illegible] lutely cured.

[illegible] however, has published a far more successful series of cases. [illegible] ated on 28 patients, including one who died on the table before [illegible] incision was made. Two others died within a few days: 25 [illegible] well, and of these all were benefited, some to a most remark- [illegible] but others relapsed. Every one of these patients had [illegible] Graves's disease, with exophthalmos.

[illegible] ently published figures show a steady improvement, due [illegible] better selection and partly to better technique. Walton's [illegible] ses operated on by himself shows a death-rate of only 2 in [illegible] urable result being obtained by exercising great care in [illegible] type of patient and time of operation, and by 'stealing' [illegible] ter the manner of Crile. Of 46 patients followed up, 25 [illegible] that is, free from symptoms, though in some the pulse [illegible] 17 were better: only 4 were little, if at all, relieved. [illegible] ed most of these for periods of one to four years. He points [illegible] there is often great immediate improvement, then a partial [illegible] few weeks later, then more or less permanent improvement [illegible] or four months.

David[11] reports a series of 200 patients operated on by various [illegible] at the Chicago Presbyterian Hospital, between 1905 and [illegible] whom 11 died. Of 65 cases followed up in 1915–16, 38 per [illegible] med to be cured, 40 per cent much better, and 18·4 per cent [illegible] better. He points out that the exophthalmos is difficult [illegible]

The immediate dangers of operation are considerable. The patients [illegible] general anæsthetic very badly, and a good many have died on [illegible] on the other hand, the pitiable nervousness makes the [illegible] operation under local anæsthesia great, and Kocher admits [illegible] considerable number are very much upset, with rapid pulse, [illegible] other alarming symptoms. Again, patients with exoph- [illegible] goitre have frequently an enlarged thymus, which may pre- [illegible] sudden death. Interference with the gland may lead to a [illegible] outpouring of thyroid secretion into the veins, with symptoms [illegible] hyperthyroidism, including very rapid irregular pulse, fever, [illegible] and increased exophthalmos: this may end in death within [illegible] two. Crile's anoci-association methods, and the adminis- [illegible] large quantities of saline per rectum, help to avert these [illegible] Occasionally tetany has followed, from injury or removal [illegible] parathyroid glands.

Comparison of Results of Medical and Surgical Treatment. We [illegible] lude, briefly, that under medical treatment, of 100 patients [illegible] of the disease, 10 go on for years without much change, [illegible] get more or less well. After operation, the early and late [illegible] together is also about 15 per cent, and the proportion of [illegible] red, better, and no better, is about the same. One benefit,

[illegible] The medical treatment is [illegible] the operation of [illegible] leads to a much quicker cure. [illegible] must be taken at the favourable time. As the Mayos and Berry have pointed out, the [illegible] attains a maximum usually [illegible] the end of the first year and from subsides and the hoped [illegible] either early or late but not at the height of the [illegible] operate on patients with a [illegible] and [illegible] prostration, [illegible] of lymphocytosis with leucopenia. Great emaciation, however, is not a contra-indication [illegible]

When there is doubt as to the patient's ability to stand an operation, [illegible] with [illegible] of the superior thyroid [illegible] or the injection of boiling water preceding the hemithyroidectomy [illegible] if necessary.

With these precautions, the present-day operative mortality is from 5 to 10 per cent, and the Mayos have now had a consecutive series of 278 cases without a death.

Sequelæ. Like other chronic invalids, patients are liable to various chest complaints, and also to profuse or uncontrollable *diarrhœa*. In many of Hale White's hospital cases, vomiting or diarrhœa was responsible for the fatal issue; in his private practice, where the patient is more fixed to be put to bed and to be suitably fed from the first, this complication was much less in evidence.

Nervous Symptoms, such as delirium or coma, are not uncommon at the decomposition, and usually point to a rapid dissolution. Mania or a catatonic state also occur.

Cardiac dilatation is fairly frequent, and acute attacks may lead to sudden death. A mitral murmur may appear.

Rarely, the exophthalmos so increases that *ulceration of the cornea*, or even blindness, may result, or the eye may be dislocated forwards on to the face.

Glycosuria is not uncommon, and several of Hale White's cases died of diabetes. In other patients, intervals of hypothyroidism and hyperthyroidism alternate with periods of hyperthyroidism.

Relapse may occur even after many months or years of apparently perfect health. In one case known to the writer a relapse was induced after more than twelve years of entire freedom from symptoms: the first attack was brought on by a head injury and the second by iodoform poisoning. In the great majority of instances, however, relapse does not occur if once complete freedom from symptoms is obtained for any length of time. Patients stand confinements very well, even if the disease is still present in mild degree. Many so-called relapses are really exacerbations of symptoms which had only partially subsided.

Prognosis in Individual Cases. In Hale White's tables, the cases are grouped according to the severity of the symptoms and the

[illegible] result. We combine the hospital and the private patients [illegible]

	Mild or average	Severe	Very severe
Cases that have done well -	36	16	9
Cases moderately well, or better	16	4	1
Cases that did not do well -	4	1	0
Total -	56	21	10

[illegible] Kocher's successful cases were very ill; in one of these [illegible] had prolapsed and had to be replaced, yet the patient [illegible] te well, with no exophthalmos. Severity of the ordinary symptoms, then, does not make a bad prognosis. Cases that come [illegible] usually get well rapidly, even if they become very ill for [illegible]

[illegible] certain danger signals. *Diarrhœa* and *vomiting* that do not yield soon to rest in bed and suitable feeding are of grave import. *Delirium* or *coma* usually heralds a rapidly fatal termination. The [illegible] ant sign is probably the *wasting*; prognosis improves or [illegible] les with the patient's weight.

[illegible] supervening on a chronic goitre are usually mild in type, but [illegible]

[illegible] most impossible to foretell how long a patient will be ill. [illegible] a months is a very ordinary time, but many cases drag [illegible] ars. When the weight is steadily falling, the outlook is less [illegible] when it is steadily rising, the patient is usually within a [illegible] nths of the end of her troubles.

[illegible] cases are on record, especially in children, in which the symptoms came on rapidly in a day or two, and as suddenly disappeared after a few weeks or less. As a rule, children do better than adults, [illegible] men better than men.

It is quite common for some degree of permanent indurative swelling of the thyroid and slight prominence of the eyes, due to fatty accumulation in the orbits, to persist even after recovery.

[illegible] [1]Hale White, *Guy's Hosp. Rep.*, vol. lxv. 1911, 1; [2]Rogers, [illegible] 1909, Dec., 1023; [3]Jackson and Eastman, *Boston Med. and* [illegible] vol. 163, 1910, 419; [4]Mackenzie, *Allbutt's System of Medicine*, [illegible] 1, 377; [5]Stoney, *Brit. Med. Jour.*, 1912, ii, 476; [6]Porter, *Jour. Amer. Med. Assoc.* 1914, lxi, 88; [7]Boisson, *Etude critique des interventions sur* [illegible] *que cervical dans la maladie de Basedow*, Paris, H. Jouve, 1898; [illegible] *Ann. Surg.*, 1909, vol. i, 1018; [9]Kocher, *Lancet*, 1912, i. 576; [illegible] *Rev. de Chir.*, 1911, 1031; [11]Berry, *Lancet*, 1913, i. 583, 664; [illegible] *Pract.*, 1917, Oct., 309; [13]David, *Ann. Surg.*, 1916, Oct., 400

A. Rendle Short.

EXTRA-UTERINE GESTATION.—(*See* ECTOPIC PREGNANCY.)

FACIAL PALSY. (*See* NERVE: [illegible])

FEMUR, GUNSHOT FRACTURE OF. (*See* GUNSHOT WOUNDS.)

FIBROIDS. (*See* [illegible])

FILARIASIS. Filariæ may be commonly present in the human [illegible] producing no symptoms. The chief danger is secondary septic infection, which may cause death after prolonged fever. Filarial abscess, lymphangitis, chyluria, and elephantiasis are rarely fatal diseases apart from septic and other complications.

Leonard R[illegible]

FRACTURES.

Simple Fractures. The world war, in its profound effects on civilization, has naturally brought a great pressure on the resources and activities of the medical profession, and hardly any department of surgery has received greater demands on its activities than the department of surgery which deals with fractures. Compound fractures in all grades of severity are continuously under treatment, and no doubt when the war is over, much information will be available and much medical knowledge acquired. As compound fractures are more suitable for the operative method, the older form of [illegible] treatment is largely and effectively used. The Thomas splint and its [illegible] modifications are achieving a well-deserved popularity in war surgery.

The second report of the American Surgical Association, 1915, deals with 1745 cases: 1358 non-operative and 387 operative. Of the latter, 258 cases of simple fracture and 129 cases of compound fracture were operated on. These numbers are disappointingly low. [illegible] in table form for comparison with the British Medical Association Report, 1912 (see below).

Before entering on a detailed consideration of the end-results of [illegible] it may be well to emphasize the fact that surgeons and practitioners for some years have had a growing consciousness that the available methods of treatment have not always yielded results which can be described as satisfactory. It is platitudinous, but nevertheless true, to say that the utility of a bone after a solution of its continuity depends in a measure on the nature and extent of the [illegible] and that [illegible] on a complete reconstitution with a good [illegible] result cannot always be expected.

It is quite obvious that there has been, and is, a constant effort to obtain good results on the non-operative side, operative methods apart for the moment, as witness the wonderful inventions which lumber up the splint rooms of hospitals, rusty worm-eaten evidences of the delusion and disappointment which attend treatment. Nearly thirty years ago, M. Lucas-Championnière[1] began to issue his protest against rigid and prolonged splint or plaster fixation; he remained until his death the grand protagonist of the school of treatment by mobilization and massage. Few now apply this method in its entirety.

its great importance as an accessory to any mode of

methods of Bardenheuer are becoming more known and those who have mastered the application of the speak highly of the results. The fracture bed in use at the Hospital, Monmouth, is particularly useful for this form of

extension method of Steinmann would appear to take a non-operative and operative practice, but its can to be sufficiently general at present to enable an formed. Finochetto's extension stirrup is an adaptation ple, and has strong advocate

a word of caution in respect of the Steinmann method the results from the point of view of the fracture tory if not brilliant. He had used the nail in 29 cases of the lower limb; in 18 cases the perforations healed in four weeks, but in 9 cases he has had an infection which five to twelve months, and in one case it was necessary abscess at the end of two years. Ewald also warns us too large a nail in the calcaneum, and observes that the be exactly in the middle of the bone there is risk of fracture. has evolved which contends that accurate anatomical and consequential good functional results, can best be by operative treatment. This school, most ably led by Lane, Dr. Lambotte, and others, energetically rejects fractures the non-operative and the older operative methods, case on the application of a plate, screw, encircling wire medullary splint, or bone inlay to the fracture, accurately free incision.

ing systems of treatment show that all is not well, and must be guarded.

ht on the subject afforded by radiography, and the the Workmen's Compensation Acts, reveal the good or various methods. The report of the late Mr. Clinton On the After-effects of Injuries," in which he states that difficulty in remembering a case of Pott's or Dupuytren's ch had sufficiently recovered to resume police work, came to the profession.

ersal desire for an inquiry into the ultimate results obtained tment of simple fractures was voiced at the meeting of the Section of the British Medical Association in London, 1910. to a resolution there passed, the Council of the Association Committee, whose report appeared in the *British Medical* November, 1912. In this report we have contrasted non- and operative methods, and it must form the basis of any the prognosis of fractures for some time to come. The cases on which the report is founded is 2940; this does e the cases investigated abroad, which are set out separately.

Amongst the important conclusions of the Committee, one finding stands out prominently, taking operative and non-operative cases together, namely, that if a good functional result is to follow, a good anatomical position must be attained. We find good functional use accruing in 90·7 per cent of cases when this latter is achieved. When the anatomical results are moderate or bad, we find only 29·7 per cent of good functional results. When the anatomical results are bad, we note 53·3 per cent of bad functional results. This shows the importance of endeavouring to obtain a good anatomical reconstitution.

A consideration of the age-group tables in the report affords further useful information. In the non-operative cases under 15 years of age, there was a good functional result in 90·8 per cent, as compared with 45·4 per cent in cases over 15.

In the operative cases belonging to the class in which operation was decided on at once and performed as soon as practicable, we find that under 15 years there was a good functional result in 93·6 per cent. In those over 15 years, operation gave a good functional result in 66·3 per cent. This shows the distinct superiority of operative as compared with non-operative methods. The operative cases are few relatively to the non-operative; hence it is not advisable to dogmatize on the greater excellence of operative results. Still, it may be assumed that as the older operative methods on the long bones, such as wiring, etc., become discarded, and more operative cases become available for comparison, even better results may be looked for in the future.

Dujarier[4] reports that in 32 cases of operative intervention for fractures of the leg, recent or old, he has not had a check; all his patients are consolidated and walking. The operations were carried out between 1904 and 1912.

Fredet[5] records his experience of operation in 20 cases, following the technique of Lambotte; he expresses himself as fully satisfied with the results.

Darrach[6] reports that of 2100 fractures treated at the Roosevelt Hospital, 5 per cent required operation. His results of operation on recent fractures were: ideal 71 per cent, fair 21 per cent, bad 8 per cent. In old fractures, operation gave: ideal 30 per cent, fair 47 per cent, bad 23 per cent.

The method of inserting a bone-graft, generally from the tibia, in ununited fractures is coming into favour, due very largely to the peculiarly attractive advocacy of the late J. B. Murphy. Albee[7] reports 15 successful cases.

In Table VI of the British Committee's report, given below, three fractures are considered, and the percentages of good functional results (apart from consideration of the anatomical result) are given. It will be seen that there is a diminishing number of good results in each group as age increases. In the words of the report, "there is a progressive depreciation of the functional result of non-operative treatment as age advances: the older the patient the worse the result."

PERCENTAGES OF GOOD FUNCTIONAL RESULTS FOR EACH AGE GROUP
(B.M.A. REPORT, *Table VI.*)
(Three Fractures.)

Tibia and Fibula. Shafts		Radius and Ulna. Shafts		Femur	
0–10	93	0–10	72	0–10	100
11–15	95	11–15	52	11–15	100
16–20	81	16–20	50	16–20	50
21–25	77	21–25	50	21–25	54
26–45	65	26–45	28	26–45	54
46–60	57	46–60	28	46–60	38
61	50	61		61	30

[illegible] V of the A.S.A. report deals with the percentages of good [illegible] results for the age groups, and is in full agreement with [illegible] VI of the B.M.A. report. The comment is as follows: "In [illegible] under 15 years of age, good functional results depend less [illegible] anatomical results than in older patients, and the bad [illegible] results are almost negligible, 3 per cent. The older the [illegible] greater is the proportion of bad results, and the more [illegible] such bad results follow failure to secure anatomical [illegible] of the fragments. The proportion of good functional results [illegible] from moderate and bad anatomical results grows progressively [illegible] older the patient." This gives a clear indication of the im[illegible] of endeavouring to secure good anatomical results.

[illegible] tables which follow, when cases are spoken of as having a [illegible] anatomical and a good functional result, it means that the result [illegible] or nearly so. The result we should all aim at is a good [illegible] and a good functional restoration of a limb. The percent[illegible] these achieved by non-operative and operative treatment will [illegible] found in the tables, and those who require this high standard [illegible] work will turn to the figures headed "Good Anatomical and [illegible] Functional Results."

[illegible] of fractures in the neighbourhood of joints, the A.S.A. [illegible] comments that it is much more important to secure a good [illegible] result in fractures involving joints than in fractures of the [illegible] bones: in shaft fractures a bad result follows in about [illegible] cases, whereas in joint fractures a bad anatomical result [illegible] bad functional result in three-fourths of the cases.

[illegible] reference to the prognosis of fractures in the neighbour[illegible] joints, the recent important thesis of M. Sauve[3] contains the [illegible] cogent conclusions:

[illegible] prognosis of intra- and juxta-articular fractures is most grave. [illegible] involving the ankle, wrist, and elbow have as a result more or [illegible] weakness, the cause of this being imperfect co-aptation [illegible] fragments, and the resulting exuberant or vicious callus, which [illegible] normal play of the articular surface. The insufficiency [illegible] treatment is thereby demonstrated. In the hands of [illegible] the ordinary measures may sometimes be sufficient, but

necessitate in whose hands the results are often bad. Surgical treatment should be undertaken more often than is usually done. The reason this latter is not generally accepted is because the surgery of bones is but recently arrived at perfection, especially that which concerns articular and intracapsular fractures. This method is capable of being perfected, and will be in the future. The usual methods have said their last word, and remain today as they have for long been, insufficient.

Whether or not these weighty words will be modified, the future experience of surgeons and practitioners alone will decide. For the present the older or non-operative methods remain "safe and serviceable." Truly, the results are not of the best; accurate reconstitution, at any rate in adults, cannot always be attained and maintained. Patients will be satisfied with bad functional results, and practitioners will continue to recommend a cutting operation. That the operative method offers the nearest approach to scientific accuracy in reconstitution, cannot be doubted. At present, as in the hands of experts, but with a more general dissemination of knowledge the treatment will be more widely applied.

A criticism put forward by some opponents of the operative method, but which is not yet proved, is that there is greater delay in the process of consolidation than under non-operative methods. Even if this fame-bear assertion to be correct, it can hardly be a serious objection; it would seem to be more important that a workman should return to work with a straight, well reconstituted limb, even after a somewhat longer convalescence, than that he should return earlier with an irregular and consequentially weak limb with the greater probability of a breakdown.

On examining the report of the British Fractures Committee more closely, it will be seen that the non-operative treatment of fractures of the shafts of the long bones in children under 15 years (excepting fractures of both bones of the forearm) shows a high percentage of good results, so it appears that operation is not a necessity in children. The Committee point out that, as previously indicated, the operative cases submitted for examination were few in comparison with the non-operative cases, and that it is undesirable on this ground to arrive at a verdict as between operative and non-operative methods. But if we take the operative cases as they are set out, we find that in cases treated by immediate operation, the deleterious influence of age upon ultimate results is less marked. In most of the age groups, operative treatment gave a greater number of good results than non-operative.

Another very definite finding of the Committee is that operative treatment should not be regarded as a method to be employed in consequence of the failure of non-operative methods, as the results of secondary operations—that is to say, operations on (1) cases in which there has been failure to obtain and maintain accurate apposition by means of external mechanical appliances, or (2) cases of non-union or delayed or faulty union—compare very unfavourably with those in which operation was carried out as soon as practicable.

[illegible]gard to the important question of *mortality*, in fifteen hospitals [illegible]ctures of the long bones were treated non-operatively, with [illegible] of 1 per cent. The majority of the deaths were due to [illegible] or associated injuries. The number of cases treated by [illegible] was 1040, with a death-rate of 0·77 per cent.

[illegible]ses which in the non-operative cases led to a fatal result. [illegible]eath in 5 of the operative cases. The death-rate directly due [illegible]on is then 0·3 per cent. Dr. Lambotte's death-rate in 567 [illegible] is 1·5 per cent; amongst these he includes operations for [illegible]ction of the iliac bone, multiple fracture of the leg [illegible]ture of the femur, and a case of irreducible subtrochanteric [illegible] fracture of the femur in an infant six days old. Another [illegible] appendicitis and evacuation of pus per anum. Most of the [illegible]ated with the injuries, accidental or avoidable.

[illegible] American Committee recommend that as a general principle [illegible] should be treated by a skilled surgeon, and that the *x*-ray [illegible]n is of great importance and should be efficiently made. [illegible] that general anæsthesia should be employed to effect the [illegible] that neither the operative nor non-operative method is [illegible]mended exclusively: each has its indications and should be [illegible] when required: non-operative methods are especially effec[illegible] fifteen years of age. This last is one of the very definite [illegible] which emerged during the British Committee's inquiry. [illegible] when operative methods are decided on, they should be [illegible]rly. This also is in agreement with the British Committee's [illegible] The American Committee recommend some rigid form of [illegible] directly to the bone, or a bone inlay, as the best method [illegible] operative cases. There can be no doubt as to the sound[illegible] principle. Absolute mechanical fixation is essential. This [illegible]undantly proved by experience, and by the experimental [illegible]oriously adduced by Hey Groves.[9] The bone inlay cannot [illegible] relied on to maintain this fully; it certainly gives good [illegible]table cases. The two Committees agree that the operative [illegible] should be undertaken only by surgeons of special experience [illegible]g, under the best possible aseptic conditions, and with an [illegible]pment ready to meet every emergency.

[illegible]enting on the statistics obtained, the American Committee [illegible]on to the fact that in the operative cases anatomical [illegible] was secured in less than 72 per cent of cases. The figures [illegible] of good anatomical results are not obtained, but only [illegible] better function follows non-operative than operative treat[illegible] Perhaps those cases in which by operative means good [illegible] results were not secured were difficult ones, or possibly [illegible] At all events very few of the operative cases belong to [illegible] which operation is decided upon at once and is performed [illegible] practicable. The American Committee observe that unless [illegible] results are obtained by operation, the slight impr[illegible] [illegible] position of the fragments, short of perfection, does not

compensate for the additional injury to the soft parts entailed by the operation. The conclusion is that unless the surgeon is reasonably certain of securing accurate anatomical results by operation, he will do better to leave the fracture unreduced.

The Committee remark that infection is the important question in the operative method; over 5 per cent of the whole operative series became infected during the operation. While good operative results were obtained by good surgeons, the infected cases are not the sole property of bad surgeons. This is in harmony with the British Committee's finding.

Both Committees' reports are examined herein in some detail.

Femur.

RESULTS OF NON-OPERATIVE AND IMMEDIATE OPERATIVE TREATMENT OF FRACTURES OF FEMUR. (B.M.A. REPORT.)

Neck	Non operative	91	16·4	9·8
	Operative	1	100	
Separated epiphysis of head	Non operative	9	44·4	22·2
Upper third of shaft	Non operative, all ages	96	54·1	4·2
	Ditto, under 15	47	87	8
	Operative (all under 15)	3	100	
Middle third of shaft	Non operative, all ages	436	67·8	13·2
	Ditto, under 15	328	87	7·8
	Operative, all ages	27	92·5	
	Ditto, under 15	25	96	
Lower third of shaft	Non operative, all ages	104	58·6	15·3
	Ditto, under 15	50	86	8
	Operative, under 20	2	50	
Lower extremity, involving knee	Non operative, all ages	12	41·6	8·3
	Ditto, under 15	2	100	
	Operative	1		

A.S.A. REPORT, *Table XII.*

Neck	Non operative	63	15·8	7·9
	Operative	6	33·3	None
Trochanter	Non operative	8	37·5	12·5
	Operative	4	25·0	None
Shaft	Non operative	264	39·3	28·0
	Operative	100	56·0	10·0
Condyles	Non operative	4	25·0	50·0
	Operative	4	25·0	None

AVERAGE DURATION OF INCAPACITY. (B.M.A. REPORT.)

Upper epiphysis and neck	26·5 weeks	No record
Shaft	16·7 ,,	16·2 weeks
Lower extremity		
Lower epiphysis	18·2 ,,	No record
Upper epiphysis and neck	53·2 ,,	No record
Shaft	33·6 ,,	52 weeks
Lower extremity		
Lower epiphysis	18·7 ,,	26 ,,
Upper epiphysis and neck	30 per cent	No record
Shaft	11·7 ,,	None
Lower extremity		
Lower epiphysis	2·5 ,,	None

A.S.A. REPORT. *Table XVI* (ALL CASES).

Neck	- -	24·5 weeks
Shaft	- -	24·3 ,,

[illegible] consider the figures of other authorities, we find Scudder[10] [illegible] 16 cases of fracture of the neck of the femur treated by [illegible] and immobilization. The cases were examined two and a [illegible]ty-four and a half years after the accident, at ages between [illegible] and over sixty. Of the 16, 14 had impairment of function; [illegible] 12·5 per cent, gave good functional results. In Walker's [illegible] 112 cases, 18 died within a week of admission to hospital, [illegible]re not traced; of the remaining 62, only 10 had completely [illegible] that is, about 16 per cent of good functional results [illegible] Ashhurst and Newell[12] give the end-results of 21 cases of [illegible] the neck of the femur treated conservatively: 5, or 23·8 [illegible] a perfect functional result.

[illegible] conclude that 26 per cent of good functional results [illegible] expect from non-operative treatment in adults.

[illegible] statistics of 35 cases of fracture of the shaft of the femur [illegible]tively by Buck's extension, outside T splint, or long [illegible]tus and later plaster, show that of 16 cases between [illegible] forty-eight years, 5 had a perfect result; in 5 cases [illegible] average age was fifty-eight years, none had a functional [illegible]. Of 14 cases where the average age was seven and a [illegible] had functionally perfect results; four mention slight [illegible] and these have a little stiffness of the knee.

[illegible] good results in 87 [illegible] 24 per cent over [illegible] cases.

Landolt's report shows 18 cases of [illegible] operated under [illegible] 10 had [illegible] and [illegible] good functional results, 2 [illegible] and 6 [illegible] of bad functional result. [illegible] 26.9 per cent of cases [illegible].

[illegible] 21 cases of [illegible] fracture [illegible] after the last [illegible] treatment [illegible]. The Lane [illegible] was carried out with Schanz screws and [illegible]. No [illegible] or [illegible] [illegible] the plate was removed for sight [illegible]. Regeneration has resulted in over [illegible] instances.

Patella.—The [illegible] to [illegible] longitudinal or subpatellar [illegible] good and [illegible] early massage and movement [illegible]. [illegible] fractures with a particular [illegible] the interposition of [illegible] between the fragments but [illegible] cases [illegible] are [illegible] to full function.

[illegible] (1890) quotes Babler's report on 11 such cases, averaging [illegible] good results. In 12 cases Wormser [illegible] accounting [illegible] per cent [illegible] 45 per cent good results.

Bilgi [illegible] (1898) [illegible] improvement. [illegible] recorded to show that 14 of the [illegible] 87.5 per cent had "excellent" results. These were all treated by placing of Paris splints, with appropriate [illegible] of the fragments.

[illegible] were applied by [illegible] massage and [illegible] to most fractures, held that the treatment is only of [illegible] application in fractures of the patella [illegible] as a general rule [illegible] for the reason that it brings about [illegible] and [illegible] contraction.

Power [illegible] (1898), collection of 344 cases operated on, exhibits a [illegible] of 14 per cent. His late results showed 94 per cent of satisfactory results, 3 per cent had marked stiffness and disability, 1 per cent [illegible] total [illegible].

Stimson (1910) records 200 [illegible] cases in two series. First series, 10 cases, 2 became infected with resulting stiffness. Second series, all recovered without accident, with good use of joint. These [illegible] 90 per cent good results.

Dickson (1912) reports 56 operations on 38 patients, ages twenty-three to [illegible]. Fixation was [illegible] in 24 cases. [illegible] 12, and of these 11, or 91.6 per cent, had good [illegible] results. He [illegible] in favour of operation [illegible].

Dickson (1914) gives an account of 90 operations; of these, 6 patients [illegible] points, but with [illegible] use; 40 have flexion [illegible] and 50 have extension points. The [illegible] were [illegible] to at least forty-five degrees when the [illegible] hospital, and a satisfactory result was expected.

[illegible]er[19] (1915) quotes a report by Quimby on 30 cases: of these [illegible] treated by suture and 6 expectantly. Serviceable results were [illegible] in 84·5 per cent of the operative cases and 66·5 per cent [illegible] expectant. He notes that certain troubles follow either form [illegible]ent, and that the operative treatment is to be preferred in [illegible] cases.

[illegible] be no doubt that in transverse fractures with separation [illegible] apart from the definite though small risk of sepsis, will give [illegible]ance of bony union, and so contribute materially to a good [illegible] result. Under operative treatment the period of incapacity will be from two to three months; under conservative treatment [illegible] to twelve months.

Constitutional disease or age may decisively influence the selection [illegible] methods.

[illegible] Corner's[20] paper puts this matter very clearly. After [illegible] that the patella is the most frequently re-fractured bone in the [illegible] points out that this occurs most often between the ages of [illegible] forty. After operation, 69 per cent of re-fractures occur in [illegible] year; after non-operative treatment, 86 per cent of re- [illegible] after the first year. The percentage of re-fractures [illegible] the same after operative as after non-operative [illegible]

Tibia and Fibula.

[illegible] Non-operative and Immediate Operative Treatment of Fractures (B.M.A. Report).

[illegible]	Non-operative, all ages	424	74·4	16·7
	Deaths, under 15	223	95	2
	Operative	17	76·4	17·6
	Deaths, under 15	7	100	
[illegible]	Non-operative, all ages	152	70·5	3·9
	Operative	2	100	
[illegible]	Non-operative, all ages	548	44·4	25·6
	Deaths, under 15	116	94	
	Operative, all ages	22	63·6	4·5
	Deaths, under 15	2	100	
[illegible]	Non-operative, all ages	246	37·5	46·4
	Deaths, under 15	8	87·5	12·5
	Operative, all ages	4	50	

[illegible] statistics for immediate operative cases of fractured tibia [illegible], with 4 good anatomical and good functional results, and [illegible] bad anatomical and good functional result: that is, 100 [illegible] of good functional results after operation.

[illegible] these statistics of 18 cases of fracture of both bones show

good functional results by operation in 95 per cent. Of 35 cases operated on, one failure to unite, an appendix nonunion, or defective or faulty union. 8 had a good anatomical and 21 had a good functional result. That is a percentage of 69 good functional results.

A.S.A. Report, *Table* XIII

Shaft [illegible]	Nonunion	73	46.5	16.4
[illegible]	Operation	19	68.4	
21 [illegible]	Nonunion	44	76.8	[illegible]
Shaft [illegible]	Operation	0		

Average Duration of Incapacity. (B.M.A. Report.)

Under [illegible] years	Shafts	12.8 weeks	9 weeks
	Lower extremity [illegible]	22 [illegible]	No record
Over [illegible] years	Shafts	26.7 [illegible]	31.2 weeks
	Lower extremity [illegible]	23.7 [illegible]	14.5 [illegible]
Pathological [illegible]	Shafts	8.1 per cent	9 per cent
[illegible]	Lower extremity [illegible]	6 [illegible]	25 per cent bad results

A.S.A. Report, *Table* XIV (All Cases).

Shafts	17 weeks
Arm	17 [illegible]

Mr. Bankhart's account of 140 cases of ankle fractures generally, 75.2 per cent recovered in four ninety-one days. 20 had passed the 100th day. Half of these had fractured both bones. 19 of the 20 had to come off for work.

Bankhart points out that this good result in older people should be taken as proof of the excellence of his extension bandage.

[illegible] traced 64 non-operative cases of Pott's fracture one year [illegible] Thirty-eight cases were under thirty-five years and all [illegible] perfect functional results. Of 12 between thirty-five and fifty [illegible] function was perfect in all the cases, extension was normal, [illegible] was distinct limitation of flexion in all. Of 14 between [illegible] and sixty-four years, "function was [illegible] perfect in 4 only, 5 had [illegible] a stiff joint. Flexion and extension were limited in all [illegible] in a careful study of 30 cases of malleolar fractures treated [illegible]atively, notes only 7 good results (23·3 per cent), 4 fairly [illegible] 9 moderate, and 10 bad.

[illegible] 6 [illegible] where operation was undertaken after the failure of [illegible] mechanical methods, for non-union, or faulty or defective [illegible] 1 had a good anatomical and 1 a good functional result, 3 had [illegible] atomical, and 3 a bad functional result.

[illegible] and Kelly[23] quote Haenel's statistics on fractures of the [illegible] fibula at the ankle. There were 40 cases: 70 per cent [illegible] red, 30 per cent became disabled; the average loss of ensuing [illegible] was about 50 per cent.

Astragalus.—The table constructed by G. Gayet[24] gives the results [illegible] operative treatment of fractures of the astragalus. If there is [illegible] displacement, or if displacement and the fragments are easily [illegible] and maintain their position, massage and early movements [illegible] all probability give a good result.

[illegible] there is much displacement of fragments, partial or complete [illegible] of the bone will be required.

[illegible] 22 cases up to the age of sixty-four years in which complete [illegible] of the bone was performed, 21 (95·9 per cent) gave a good [illegible] in the sense that the patient was able to return to his occupa[illegible] bad result was in a case operated on eight months after the [illegible] Of 10 cases of partial removal, 1 only (10 per cent) gave an [illegible] result, 1 a satisfactory result, and 1 returned to work but [illegible] fatigued.

[illegible] and Binney[25] give figures in respect of 8 cases. There was a [illegible] in 25 per cent and a bad result in 75 per cent, and they [illegible] that the results are distinctly worse than in fracture of the [illegible]. The average period of disability was about a year and [illegible] In making a prognosis from an *x*-ray photograph in cases of [illegible] of the astragalus, it is well to remember that the posterior [illegible] of this bone has a small tubercle, the os trigonum, which [illegible] has a separate existence and so simulates a fracture.

Calcaneum. Three forms of this fracture are recognized: (1) *Of [illegible] portion with the tendo Achillis*; (2) *Comminution of [illegible]*; (3) *Of the sustentaculum tali*.

[illegible] first form there is not usually much separation of the frag[illegible] but if there is, then operation and fixation by a screw will [illegible] best results. In the second form [illegible] not generally feasible; operation may be required to remove [illegible] in any case the results are very unsatisfactory. In the

thirteen; there generally remains a certain amount of eversion and [illegible] of the inner border of the foot.

In all the forms there frequently follows pain in the foot and difficulty in walking. Consolidation of the fracture takes much delayed and prolonged should be borne on the foot for at least six weeks.

Elton records 12 cases of fracture of the calcaneum in 1905; were three not good (86 per cent.).

Cabot and Binney[25] [illegible] 26 cases, [illegible] good results in 50 per cent., fair in 38 per cent. and bad in 12 per cent. These good results seem to be quite above the average and appear to be accounted for by the fact that 7 were [illegible] and that 5 of these had good, and 1 a fair result. The average [illegible] of disability was about [illegible] months. The present appears short, possibly on account of the [illegible] of heel-fragment cases in the series.

Cotton[27] reports on 33 cases. Only 7 had anything approximating a good result. He believes that he is obtaining better results by mobilizing the fragments and practicing [illegible] by hemmage.

Cuboid. Fracture of this bone is rare, and has [illegible] generally great displacement of fragments [illegible] the foot [illegible] a comminuted one. A good result can be expected.

Tarsal Scaphoid. Isolated fracture of this bone is not very common. Considerable number of cases have been reported. It is difficult to guard in the fragments [illegible] expected on [illegible] than; but if this can be [illegible] good result will probably follow. In cases where the fragments cannot be [illegible], recourse by operation is indicated.

Macaulaud and Wood[28] report 2 cases of fracture [illegible] and six months' slanting of [illegible] [illegible] for [illegible] good anatomical result in both.

Abel and Ranger[29] report 28 cases, [illegible] the result is unknown. 4 were operated on, and [illegible] good result; 11 were treated non-operatively, and [illegible] good, 4 moderately and [illegible] bad result. The table [illegible] the [illegible] treatment for immediate action, such as [illegible] and [illegible] reduction may cause. In forming an opinion from a radiograph it is well not to overlook the accessory presence of a [illegible] bone in the friends [illegible] bone; it might be taken for a fracture of the scaphoid [illegible].

Cuneiform Bones. Fracture of these bones occurs in a [illegible] with a crush of the foot, and the prognosis depends largely on the damage to other parts. If a [illegible] can be made and the soft parts recover, then a fair result may be expected.

Metatarsals. Fracture of these bones has [illegible] considerable disability in the case of the foot, a [illegible] on the [illegible] cannot be achieved. If there is much displacement of the fragments, the usual [illegible] fixation by operation give good results. Fractures [illegible] with marked upward or downward displacement frequently cause very definite disability.

Metatarsal (Jones's fracture). An indirect fracture which [illegible] inversion, treading on the outer side of the foot: the line [illegible] is near the base. There is neither crepitus nor deformity [illegible] is depends on the radiographs, and the prognosis is good.

Phalanges. These fractures are frequently compound, and the pro[illegible] depends largely on whether the wound infection is localized, or [illegible] extensive, involving joints and tendon sheaths. In the former [illegible] it will be good, and in the latter great disability will ensue.

Humerus. It will be observed from the table appended that the [illegible] of fractured tuberosity are not good, and it seems reasonable [illegible] better in cases in which the fragment is separate if it is fixed [illegible] by means of a screw.

[illegible] OF NON-OPERATIVE AND IMMEDIATE OPERATIVE TREATMENT [illegible] (B.M.A. REPORT).

[illegible]	5	80	
Operative	2	100	
Non operative, under 20	5	80	[illegible] 20
Operative, under 20	2	100	
Non operative	3	33	
Non operative, all ages	37	40	17 [illegible]
Ditto, under 20	10	100	
Operative, all ages	6	60	
Ditto, under 20	2	100	
Non operative, all ages	68	64·5	21·[illegible]
Ditto, under 15	18	61	22
Operative, all ages	6	8[illegible]	
Non operative, all ages	17	41·1	11·1
Ditto, under 15	8	75	12·[illegible]
Operative, under 15	1	100	
Non operative	50	44	22
Operative	14	57·1	7·1
Non operative, all ages	17	41·1	2[illegible]
Ditto, under 15	11	72·7	
Non operative, under 25	7	14·2	42·8

U.S.A. REPORT. *Table A.*

Non operative	15	60·0	20·0
Operative	15	40·0	6·6
Non operative	19	47·3	36·8
Operative	8	12·5	N[illegible]
Non operative	56	76·7	16·0
Operative	13	53·8	No[illegible]

S[illegible] fractures of the anatomical neck, 2 [illegible] under ten [illegible] operation after failure of non-operative methods [illegible]. In all the results were good, that is, 100 per cent. [illegible] good functional results. The operative results [illegible] the cases of this class.

In 15 cases of fracture of the shaft in which operation was undertaken because of failure of non-operative methods owing to faulty [illegible] union, 66.6 per cent. had good functional results.

In [illegible] cases of supracondylar fracture, 2 [illegible] under ten years, in which operation was undertaken for failure of non-operative methods [illegible] 100 per cent. had good functional results.

S[illegible] of internal [illegible] epiphysis were operated on for the same reason. [illegible] per cent. had a good functional result.

In [illegible] cases of fracture of the external condyle on which operation was undertaken after failure of non-operative methods the functional result was [illegible].

Musculospiral Paralysis occurs in from 4 to 8 per cent. of cases of fracture of the humerus, being associated most frequently with fracture in the middle third of the shaft. The prognosis is fairly good after suture or release of both. Scudder and Paul's[?] table of 11 cases treated by operation shows 8 cases of recovery of function = 72.2 per cent., the shortest interval in the successful cases between the accident and the operation being three weeks and the longest three years. The statement of Bruns that 50 per cent. of all cases require operation seems to be worth noting.

Hitzrot [illegible] refer to 141 non-operative cases of fracture of the upper end of the humerus. Two were in children, 1 treated by non-operative and the other by operative methods; both had perfect results. In the remaining 139 cases, hyper-abduction to the amount of 5 per cent. was lost in all except 2; external rotation to the amount of 5 to 10 per cent. less than normal was present in all cases.

The treatment adopted was: Arm flexed and laid on a sling, cushion in axilla, extension of from 5 to 10 lb. applied and allowed to hang for [illegible]. When fracture is reduced, shoulder plaster splints back and front, down to wrist [illegible] control splints on for three to five weeks. Massage and movements [illegible] at ten days. Galvanic and faradic currents [illegible].

S[illegible] on the indications for and results of excision of the [illegible] in fracture and dislocation, observes that this is not a complete [illegible], but merely partial, that is, removal of the head of the humerus. He states that he is much impressed by the disability [illegible] this operation. The operative [illegible] 59 per cent. of the patients had only fair results. This is striking when contrasted with [illegible] of unreduced dislocations and fractures with [illegible] good function.

Lower End of Humerus. There were 106 cases, all under ten years; 51 cases of fracture of the external condyle in children treated by

[illegible] for two weeks, then massage; in 1, a fracture had to be [illegible] all had perfect return of function; 54 [illegible] supracondylar [illegible] in children reduced under anæsthesia, arm flexed at [illegible] angle [illegible] two cases had musculospiral [illegible] and were operated [illegible] becoming complete in twenty weeks in one case, in the [illegible] satisfactory, in thirty-six weeks.

[illegible] cases, 50 had no perceptible deformity; function of the [illegible] was perfect in all cases. In 34 adult [illegible] 12 involved [illegible] condyle; 11 were uncomplicated; all treated by as much [illegible] as possible; no deformity resulted; function excellent, [illegible] perfect. Six cases of fracture of the internal condyle were [illegible] by reduction under ether and flexion; function excellent in [illegible] cases.

[illegible] *the Elbow.*—André Trèves[1] gives a careful account of [illegible] results of 162 cases in children, as follows:

[illegible]	18	51	10	Perfect function in 88 per cent
[illegible]	17	21	4	Excellent function 80 per cent
[illegible]	1	16	17	Perfect function 51 per cent
[illegible]	0	1	1	Satisfactory 50 per cent
[illegible]	3	2	0	Perfect function 100 per cent

[illegible] supracondylic cases had operations for defective union, and 6 [illegible] injuries.

[illegible] internal condyle cases had operations for defective union, and 3 [illegible] injuries.

[illegible] fractures of the internal condyle with luxation had 10 [illegible] results—77 per cent.

[illegible] figures again show that good functional results are obtained [illegible] by non-operative methods. Trèves says that the treat- [illegible] in supracondylic by flexion, where extension is required, [illegible] supracondylic with lateral displacement, where extension is [illegible] should be by immobilization in flexion, the duration of [illegible] being from eight to fifteen days, and not beyond three [illegible] Early massage and movements are harmful, because they [illegible] excessive callus in children, and besides, they are very [illegible]

[illegible] lesions complicating fractures of lower end of the humerus is [illegible] often present; they rarely require operation. Roberts and [illegible] give statistics as follows: Ashhurst, 1 case of median-nerve [illegible] 76 cases; Coenen, 3 musculospiral injuries in 31 supracondylar [illegible] Destot, Vignard, and Barlatier, 1 case of musculospiral [illegible] 1 case of median injury in 72 fractures above the elbow; Broca [illegible] Monchet, 9 cases of nerve injury in 78 elbow fractures. Muller

[illegible] [illegible] 20 per cent of all [illegible]

[illegible] Ashburst recording the end result of [illegible] the [illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	56	[illegible]	[illegible]
[illegible]	31	[illegible]	[illegible]
[illegible]	31	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	21	[illegible]	[illegible]

[illegible] 40 per cent [illegible] perfect results.

[illegible] that an [illegible] [illegible] that there will eventually [illegible] prospect.

[illegible] Report

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible] Report [illegible]

[illegible]	[illegible]
[illegible]	[illegible]
[illegible]	[illegible]

[illegible] of Non-operative and Immediate Operative Treatment of Fractures of Radius and Ulna. (B.M.A. Report.)

[illegible]	Non-operative [illegible] 15	2	50	
	Non-operative [illegible]	45	53.1	[illegible]
	Dito [illegible] 15	19	73.6	[illegible]
	Operative [illegible]	7	57.1	[illegible]
	Dito [illegible] 15	4	75	[illegible]
[illegible]	Non-operative [illegible]	15	66.6	[illegible]
	Dito [illegible] 15	11	63.6	[illegible]
	Operative [illegible] 10	1	100	
	Non-operative [illegible]	47	27.6	[illegible]
	Dito [illegible]	4	100	
	Operative	1	100	
[illegible]	Non-operative [illegible]	20	45	[illegible]
	Operative [illegible]	19	73.6	[illegible]
	Non-operative [illegible]	18	77.7	[illegible]
	Dito [illegible]	10	80	[illegible]
	Operative	1	[illegible]	[illegible]
[illegible]	Non-operative	3	100	
	Non-operative [illegible]	2	38	[illegible]
	Dito [illegible] 15	76	63	
	Operative [illegible]	54	75	
	Dito [illegible]	3	100	

Vs. Report, *Table XI.*

	Non-operative	53	60.1	[illegible]
	Operative	24	70.8	[illegible]
	Non-operative	12	50.0	[illegible]
	Operative	3	66.6	[illegible]

[illegible] there are 15 cases of fracture of the head of the radius with displacement. Flexion and extension eventually were completely [illegible] in 11 cases pronation and supination were only half the [illegible]. Of 4 cases with displacement of fragments, in 2 the head had [illegible] in the remaining 2 a broken fragment was removed. The functional result was best in the cases in which the head was completely removed, and not good in the 2 cases [illegible] removed.

[illegible]

In 10 cases of fracture of the neck of the radius of the transverse type, [illegible] in [illegible] found 2–21 per cent. bad results and [illegible] functional result.

If the head of the radius is removed, [illegible] the considerable lateral [illegible] and [illegible] expected advantage [illegible].

Arthrosis of the radial is to be treated as an [illegible] separation of [illegible] epiphysis.

Poland [illegible] 17 cases of a total of over 700 of these cases. He also [illegible] 50 cases of arthrosis after these injuries, the radial [illegible] 3 cases. Recently, 3 cases have come under his own observation. The fragmented length of the radius, and the [illegible] the head as characteristic [illegible]. Result: [illegible] functional result [illegible].

Table VII [illegible] B.M.A. Report [illegible] summary of all fractures [illegible] of the [illegible].

[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[illegible] Dislocation or Excavation (B.M.A. Report)

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible] (Alt [illegible])

[illegible]

Carpal Scaphoid [illegible]

[illegible] in sixth week. The result was that hyperextension was [illegible] flexion in 1, with pain on movement. In 3 cases with [illegible] of proximal fragment, the latter was removed by dorsal [illegible] treated as the foregoing: result, extension two-thirds [illegible] seven-eighths normal, deflection less than normal.

[illegible] cases with similar displacement associated with dislocation [illegible] lunar: the fragment and the semilunar were removed in [illegible] was fair. In the fourth case the fragment of the scaphoid [illegible] and an ineffectual attempt to reduce the semilunar was [illegible] result at the end of nine weeks was a stiff wrist. The pro[illegible] wholly good, though Cotton[15] says that in 3 of his cases [illegible] of fragments was done in uncomplicated fractures [illegible] practically perfect.

[illegible] thinks that in view of the unsatisfactory results ordin[illegible] the fragments could be readily held together by a fine [illegible] better result.

[illegible] records 3 cases of fracture of the carpal scaphoid with [illegible] median nerve, which eventually made a good recovery [illegible] injury. In examining a radiograph for this fra[illegible] necessary to remember that in about 1 per cent of persons [illegible] normally divided into two parts in the course of development [illegible] might be mistaken for a fracture.

Semilunar. A number of cases of fracture of this bone have been [illegible] Ebermayer,[16] Finsterer,[17] and others. It is a compression [illegible] The prognosis is not good as regards function: the bone [illegible] on account of pain and diminished movements [illegible]

Os Magnum. Fractures of this bone are relatively rare. Harrigan [illegible] 6 authoritative cases, including one of his own: in 2 [illegible] diagnosis confirmed by *x* rays. The results do not seem [illegible] In none of the cases is it stated that a good result [illegible]

Trapezium, Trapezoid, Unciform, Pisiform.—Fractures of these [illegible] been reported. They are important, for they are likely to [illegible] by ankylosis, so that the best results may be expected [illegible] pressure, early passive movements, and massage.

Metacarpals.—*Fracture of the First Metacarpal.*—This may occur at [illegible] of the shaft or at the base. If good alinement can be [illegible] maintained, a good result may be expected.

[illegible] *the Base* (Bennett's Fracture).—An oblique fracture [illegible] Good anatomical reposition is not always achieved. [illegible] functional results may follow.

[illegible] had a good result by fixing the fragment into posi[illegible] by screw.

[illegible] *the Basal Epiphysis* of the first metacarpal occasionally [illegible] In the two cases recorded by Cones[9] a good result followed.

[illegible] *the Shafts* of the other metacarpals are apt to give [illegible] if a good alinement cannot be achieved: if this is

adjusted and maintained, the results are good. In difficult cases, oblique fractures and such like, Lambotte recommends a small form of bipolar or a small plate or cerclage, as giving good results.

Fractures of the Head.—Knuckle fracture (pugilists' fracture).—According to Cotton, some deformity always remains. Flexion may be impaired, function generally is good. He quotes a case in which there were fractures of these fractures in both right and left hands without serious loss of function occurring, except in one knuckle.

Phalanges.—These fractures usually unite well, and unless the crush, which is generally the cause, is severe, a good result follows moderate readjustment of the fragments.

Sesamoid Bones of the Thumb.—This fracture has been described by Poirier; no bony union followed, but the functional result was good. Pegg, G. Shelton, collects 4 cases of these fractures, including the case of Poirier. 3 of them were due to direct violence, 1 was possibly due to indirect violence. He says that immobilization in extended position by a splint of sodium dressing fulfils all indications.

Scapula.—*Fractures of the Body* are often multiple. Union takes place frequently with overlapping, or exuberant callus, but generally painless and good functional results ensue. Cotton states that in his 10 cases the results were practically perfect.

Processes.—Coracoid fracture is rare. Union may be fibrous or bony, in either case the functional results are nearly always good.

Spine.—The spine may be broken at the roots of bone, including the acromion, may be separated, some deformity, but no permanent disability, results.

Glenoid.—Fracture is rare, except as an accompaniment of dislocation of the head of the humerus. It is possible that cupping off of the glenoid may predispose to recurrence of the dislocation.

Coracoid.—The line of fracture is usually well behind the tip, but this may be split longitudinally. Union is sclerotic bony, but there is no displacement unless the coracoclavicular ligaments are torn. Rarely is there any great functional disability.

Neck.—The line of fracture is through the suprascapular notch to the axillary border. Bony union with some displacement is the rule. In the majority of cases good functional results ensue.

Sternum.—Fractures of this bone are usually associated with damage to the intrathoracic or abdominal organs, and the prognosis may depend on the extent of injury there. Guilt collected 98 cases, and of these 54 were simple cases, 46 recovered, 8 died; whilst of 44 cases complicated by severe injuries, only 1 recovered.

Fracture of the Ensiform Cartilage may occur. It is sometimes followed by troublesome vomiting, which, in one of the 4 cases tabulated by Guilt, persisted for two years and then ceased spontaneously. In three of the cases vomiting ceased when the depressed cartilage was drawn forward.

Clavicle.—These fractures usually unite well; non-union is rare. Callus band is firm at the end of four weeks. Displacement, deformity,

and shortening are the rule. The amount of shortening may be as much as two inches. These conditions, however, do not follow in [illegible] which the line of fracture is transverse, and where displacement is absent at the beginning.

[illegible] deformity and shortening, the functional usefulness of the [illegible] much interfered with.

[illegible] complications of this fracture, which render the prognosis [illegible] injuries to the subclavian artery and vein, brachial [illegible] and pressure by exuberant callus. If operation is [illegible] deformity and failure of the usual treatment to [illegible] a correct position, or for other reasons, a screw driven in longitudinally, or cerclage (Lambotte's), or a fine Lane plate away from the skin, will give good results.

[illegible]. Simple fractures without complications do very well. If [illegible] forms and persists, it may cause pressure on inter[illegible] and persistent pain may follow. In old or feeble per[illegible] the outlook is more serious, pneumonia being the [illegible] sequela.

Cartilages. Fractures occur most frequently near the costo[illegible] the seventh and eighth being most often involved. [illegible] good. Union takes place by means of osseous or [illegible].

[illegible]s. Fractures of the pelvis are not common, and the prognosis [illegible] on the associated damage to pelvic viscera.

[illegible] of death in many cases. If the patient recovers, [illegible] deformity, which, if it obstructs the pelvic outlet [illegible] serious matter during parturition. On the other [illegible] injuries, the results may be quite good.

[illegible] of 54 cases, with a mortality of 50 per cent. [illegible] were done [illegible] four for ruptured bladder or rectum [illegible]. Four external urethrotomies were required; two died. Fractures of this bone are frequently followed by much [illegible] times by severe pain. Excision gives very excellent [illegible]. [illegible] figures on the prognosis in respect of the various [illegible] pelvis.

Ilium. Nine cases. In 1 laparotomy was necessary, in 1 radical [illegible] of the fracture. Of the 9 cases, 8 are definitely recorded as [illegible] per cent.

[illegible] *Ischium.* Ten cases. In 6 there were urinary sym[illegible] degrees of severity. Most of them were complicated [illegible]. Death occurred in 1 case, 3 cases required opera[illegible], i.e., 60 per cent. were definitely cured.

[illegible] *Pubes.* Two cases. No complications occurred. One [illegible] cured, i.e., 50 per cent.

Fractures of Pelvic Ring. Five cases. There were urin[illegible] operation was performed in 2, there were 2 [illegible] 20 per cent.

Superior Maxilla. In uncomplicated cases union takes place in about four weeks. Severe [illegible] follows as a consequence of the [illegible] involved in callus. Deformity [illegible].

Malar Bone. The prognosis is usually good. There [illegible] generally little callus formation. Reposition should be attempted early.

Nasal Bones. The prognosis must be very guarded as to cosmetic [illegible]. The primary external disfigurement does not tend to become [illegible] but the internal obstruction [illegible].

Mandible. Simple fractures in which the mucous membrane is not [illegible] the prognosis is usually good. Even [illegible] fractures [illegible] with remarkably good results. [illegible] statistics show that this occurs in only [illegible] of all pseudo-arthroses noted. Fractures of the condyloid [illegible] followed by ankylosis of the temporomaxillary joint.

Hyoid Bone. Fractures of this bone are extremely rare, owing to its [illegible] and protected position. In Gurlt's collection of 27 [illegible] 21 were fractures of the bone alone. In simple uncomplicated fractures the prognosis is good. The serious complications are œdema of the [illegible], abscess, and haemorrhage.

Larynx and Trachea. The prognosis is very grave. Of 75 cases reported before 1879, the mortality was 78·6 per cent. Of 70 cases reported since that date, the mortality was 37 per cent. The dangerous complications are œdema of the larynx, intralaryngeal and [illegible], mediastinal emphysema, septicæmia, and [illegible].

ESTIMATION OF DEPRECIATION OF CAPACITY FOR WORK.

BROUARDEL'S *Table I.*

RIGHT UPPER LIMB				
Loss of whole limb	70–80	70–80	50–70	70–90
Loss of part below elbow	70–80	70–80	50–60	70–90
Loss of hand	60–75	65–75	45–55	70–90
Loss of thumb	25–35	25–35	15–25	40–55
Loss of index finger	10–15	10–25	10–15	25–35
Loss of middle finger	10–15	10–15	5–10	15–25
Loss of ring finger	5–10	5–10	5–10	15–20
Loss of little finger	5–10	5–10	5–10	15–20
Complete ankylosis of shoulder	40–55	40–50	25–35	40–65
Incomplete [illegible] according to degree	10–40	10–40	10–25	30–40
Complete ankylosis of elbow	30–40	30–35	10–25	35–45
Incomplete [illegible]	10–30	10–30	0–10	20–35
Complete ankylosis of wrist	20–35	20–30	5–15	30–45

Broadbent's *Table II.*

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Lame				
[illegible]	60–70	60–70	40–50	50–80
[illegible]	60–70	60–70	40–40	50–80
[illegible]	55–65	55–65	30–40	50–80
[illegible]	15–25	15–25	10–25	25–40
[illegible]	5–15	5–15	5–15	15–25
[illegible]	5–10	5–10	5–10	15–20
[illegible]	5–10	5–10	0–5	10–15
[illegible]	0–10	0–5	0–5	5–10
[illegible] of shoulder	40–50	30–45	10–25	35–55
[illegible] of shoulder				
[illegible]	10–40	10–30	0–10	10–35
[illegible] of elbow	25–35	25–35	5–15	25–40
[illegible] of elbow				
[illegible]	5–25	5–25	0–5	10–25
[illegible] of wrist	15–20	15–20	5–10	20–30
[illegible] of wrist				
[illegible]	5–15	5–15	0–5	5–20

Broadbent's *Table III.*

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Lame				
[illegible]	50–75	50–75	70–90	50–75
[illegible]	50–70	50–70	60–80	50–70
[illegible]	40–60	40–60	60–80	50–60
[illegible]	25–35	20–30	40–60	25–35
[illegible]	15–20	10–20	20–40	15–20
[illegible] of the power				
[illegible]	25–35	20–30	45–60	25–35
[illegible] of the power				
[illegible]	up to 25	up to 20	up to 45	up to 25
[illegible] of hip	30–45	30–45	60–80	30–35
[illegible] of knee				
[illegible]	10–30	10–30	40–60	10–30
[illegible] of knee	20–30	20–30	40–50	20–30
[illegible] of knee				
[illegible]	10–20	10–20	50–40	10–20
[illegible] of ankle	10–25	10–25	40–60	10–25
[illegible] of ankle				
[illegible]	0–10	0–10	30–40	0–10

On the Continent cases in which there is complete and permanent disablement, compensation is allowed equal to two-thirds of the wages earned. In the United Kingdom, half the average weekly wage is paid so long as there is incapacity for work. The worker will receive his full compensation, so long as he is unable to do any work.

The preceding tables are after Brouardel,[11] 100 being reckoned as the total depreciation of depreciation. This figure is applied to such cases as complete loss of vision or loss of the use of two limbs. The tables will give a general idea of the depreciation in working capacity in the various permanent injuries, four types of workers being selected. The short notes which follow are intended to give a general idea as to the working capacity after injury of men who follow arduous occupations. The figures are taken from Brouardel, Rohmer,[15] Ollive et Le Meignen,[7] and others.

Fractures at The Upper End of the Femur which result in non-union or excessive callus formation with interference with the movement of the joint, and ankylosis, may seriously depreciate a workman's earning capacity. He may be compelled to use a stick, or even a crutch, and he will in all probability be obliged to seek other employment if his usual work required the full use of his hip-joint, as would be the case if the work involved climbing ladders, etc. Wasting of muscles is a frequent accompaniment of partial ankylosis, and adds to the incapacity. Complete ankylosis of the hip may be estimated at a, which is 80 or even 90 per cent.; at an angle, 58 per cent.; atrophy of muscle, 33 per cent. If fixed in the flexed position, walking and standing will be interfered with; and if the fixation is in the extended position, there may be a difficulty in sitting. It will probably take at least eight months before the patient is fit to begin work in an ordinary simple case of fracture of the neck; this is presuming that the patient is not beyond middle age, and that there are no complications, such as arthritis, phlebitis, pseudarthrosis, etc.

Fractures of the Shaft of the Femur may be followed by non-union and almost complete incapacity for work. Union with shortening and deformity is more common. In measuring the shortening it is well not to forget that there is sometimes a difference in the length of normal lower limbs. Some authorities state that this is as much as 1 cm., and the increase is generally in favour of the left limb, so that a shortening to this extent may be considered of no importance. Ollive and le Meignen are of opinion that shortening below 3 cm. should not be compensated unless it is associated with other lesions. Brouardel reckons great shortening to be that above 5 cm., and values it up to 60 per cent. In the lesser degrees of shortening, a great amount of accommodation occurs, and this can be easily assisted by adding to the thickness of the sole of the boot. In the greater degrees, correction is difficult and the incapacity for work is considerable, save in those workers who can sit at their occupation. The foregoing remarks on shortening apply equally to fractures of the tibia and fibula.

[illegible] deformity and excessive callus formation may prevent the [illegible] of muscles. Pain will follow the involvement of nerves in [illegible] and it is frequently a cause of incapacity in cases of union with [illegible] or bowing of the limb; standing for a length of time [illegible] sometimes impossible. If good alinement of the fragments is achieved, [illegible] will take place in four to six months; in many cases it will [illegible] as much as twelve.

Fractures involving the Knee-joint are sometimes followed by [illegible] or less ankylosis or weakness in the joint. If the ankylosis is in [illegible] straight position, the incapacity is about 40 per cent; in the [illegible] position, according to degree, up to 50 per cent; relaxed knee [illegible] 58 per cent. The insecurity here is most noticed in going up or [illegible] ladders or stairs. Marked wasting of the muscles of the thigh [illegible] injuries to the knee-joint. In simple cases it genera[illegible] six to twelve months for full working capacity to be [illegible]

Fractures of the Patella.—If bony union is achieved, the return to [illegible] is the usual course. If the union is fibrous and there is [illegible] separation of fragments, a useful, though not perfect, limb [illegible] If there is much separation of fragments, a weak and flail [illegible] result, with consequent incapacity, which may be [illegible] per cent.

Fractures of the Shafts of Tibia and Fibula, united with deformity [illegible] callus, are often associated with thrombosis, swelling [illegible] trophic troubles. If non-union occurs, the incapacity [illegible] If the fracture is in the upper end, involving the knee-joint, [illegible] condition may approximate to that found in fractures of [illegible] involving the knee-joint (q.v.).

— *Fibula is fractured* near the upper end, the peroneal nerve [illegible] either in the fracture or in the resulting callus, and [illegible] talipes equinovarus ensue, with incapacity for work. [illegible] see FRACTURE OF FEMUR.) In favourable cases a [illegible] fit to return to work in three or four months.

— *At the Lower End of the Tibia and Fibula involving the* [illegible] are grave injuries, and very frequently result in serious [illegible] Deformity, a varying degree of ankylosis, and pain are [illegible] frequent sequelæ. If the foot is fixed at a right angle—the [illegible] position—the incapacity may be from 15 to 20 per [illegible] according to the nature of the work. If fixed at an acute angle, [illegible] position, the incapacity may be as much as 60 per [illegible] The older the patient, the less is the chance of his being able [illegible] full work.

[illegible] of the late Mr. Clinton Dent, mentioned earlier, having [illegible] to that picked body the Metropolitan Police, shows how [illegible] these injuries are in persons whose occupation requires [illegible] or walking.

Fractures involving the Tarsus and Metatarsus may sometimes [illegible] incapacity, occasionally equal to loss of the foot, on

account of pain, swelling, and at times the travelling of standing for a long time. Foot fault may change and be contracted at from 30 to 50 per cent. Sometimes the origin of the sound foot overstrained by the weight of the body being thrown onto it in an effort to save the injured foot, and so conditioned that foot is a previously healthy foot.

In metatarsal fractures, if there is much displacement of the fragments either in an upward or downward direction, the presence of the weak or sore foot may cause definite incapacity—metatarsalgia may cause.

Fractures of the Toes rarely cause incapacity unless they become compounded and septic. The loss of the great toe is estimated at from 10 to 20 per cent. The loss of a single phalanx does not cause any incapacity unless the scars are tender. The loss of several toes or all the toes may be estimated at from 20 to 30 per cent. is a maximum.

Incomplete tibial fractures should be six to eight months before the patient is able to undertake heavy work, or in metatarsal fractures three to six months.

Fractures about the Upper End of the Humerus may be followed by more or less ankylosis and a consequent limitation of movement, atrophy of muscles, signs of an osteomyelitis, neuritis or chronic arthritis. Ankylosis may be estimated according to degree at from 50 to 60 per cent.; atrophy of muscles 28 to 58 per cent.; chronic arthritis 16 to 66 per cent. Arthritis may greatly delay recovery. Benign cases do well usually in two to four months, but severe ones may last as long as twelve months or more.

Fractures of the Shaft of the Humerus may be followed by non-union (which is relatively frequent), faulty position, pain and involvement of the musculospiral nerve in callus. Any of these may cause almost complete incapacity. In uncomplicated cases recovery is usually complete in three to four months. Non-union occurs with greater frequency after fracture of the shaft of the humerus than after that of any other bone: 376 in 1274 cases of non-union in all bones. According to Binns, only 56 per cent. of recoveries follow resection: in 187 cases of pseudoarthrosis of the humerus so treated, 98 recovered, 3 were improved, 73 were unimproved, 5 died.

Fractures at the Lower End of the Humerus and Elbow-joint may be followed by complete or incomplete ankylosis, or loss of movements of pronation and supination. Ankylosis in extension may be estimated at from 40 to 50 per cent.; in mechanic flexion, 35 to 40 per cent.; in acute flexion, 20 to 25 per cent. Loss of pronation and supination may be a serious disability, especially in skilled workers, mechanics, etc. Simple uncomplicated cases frequently recover full working capacity in three months.

Fractures of the Radius and Ulna are sometimes followed by disability due to non-union or faulty union. In non-union the forearm is practically useless, and in faulty union there is frequently loss of pronation and supination.

Fractures at the Lower End of the Radius and Ulna involving the

[illegible] are sometimes followed by more or less ankylosis. Com[illegible] of the wrist is estimated at from 25 to 33 per cent [illegible] losis may not interfere with working capacity except in [illegible] skilled trades. In favourable cases, probably about three [illegible] be reckoned as the period of recovery.

Fractures of the Carpus may cause ankylosis similar to that which [illegible] in the wrist-joint. Simple cases recover in from one [illegible] months; the shorter period will apply to those cases in which [illegible] can be begun early.

Fractures of the Metacarpus are not usually followed by any very [illegible] capacity unless the bones are united with great displacement.

Fractures of the Phalanges do not generally cause much disability [illegible] ankylosed in a straight or flexed position, there will be [illegible] with the full power of the hand, and amputation may be [illegible] restore function. Loss of the thumb is the most important [illegible] as a forceps as well as a grasping instrument. If loss of a [illegible] reckoned at from 50 to 75 per cent, loss of the thumb will be [illegible] one-third of this. Ankylosis of thumb-joints, 25 to 33 [illegible] of a single phalanx of the thumb is a serious matter. [illegible] finger, 16 to 25 per cent. Ankylosis of index joints, 8 [illegible] cent; loss of one or more phalanges of the index will equal [illegible] thirds of the total loss of the index. The estimation of [illegible] the middle finger is about 8 to 16 per cent, and the loss of [illegible] a little less. The loss of the little finger is valued [illegible] last two mentioned.

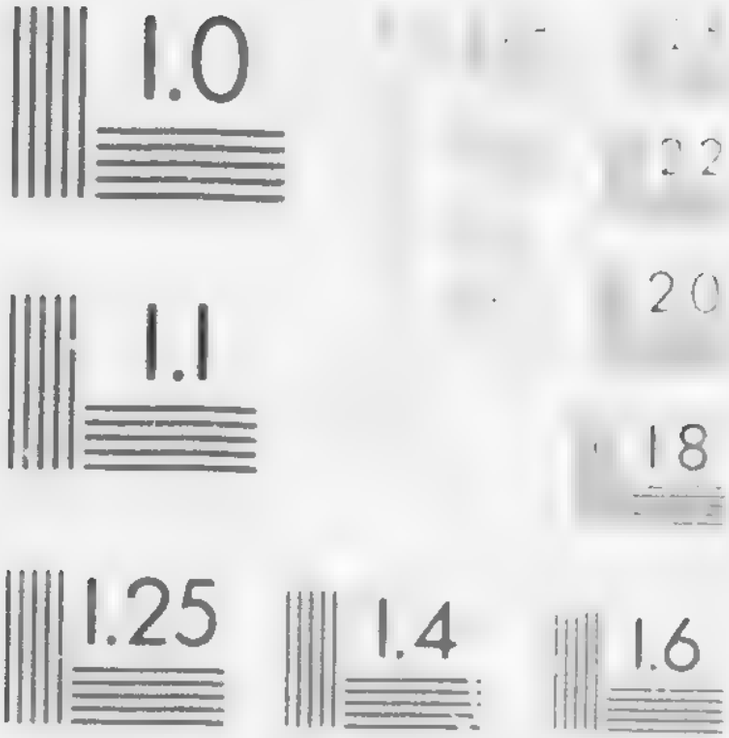
Fractures of the Scapula.—If union is in a faulty position, so as to [illegible] with the movements of the shoulder or render these painful, [illegible] of the incapacity is estimated at from 10 to 30 per cent. [illegible] about the shoulder are followed by an amount of wasting [illegible] which frequently takes quite a long time to recover.

Fractures of the Sternum.—In simple uncomplicated fractures the [illegible] usually good, though pain is sometimes persistent, but [illegible] incapacitating. If the ensiform cartilage is driven [illegible] operation may be required to raise it. Remy[47] suggests [illegible] per cent valuation for a sinking in of the sternum without [illegible]

Fractures of the Clavicle usually result in some deformity; but if [illegible] by injury to adjacent parts, there is in most cases an [illegible] recovery. Non-union is rare, but if it occurs an operation [illegible] necessary. Excessive callus formation may cause pressure [illegible] pain, and incapacity for work. The estimation for im[illegible] recovery is from 16 to 50 per cent. In an ordinary case [illegible] months will elapse before full work can be undertaken. In [illegible] it may be much longer.

Fractures of the Ribs.—Uncomplicated fractures usually heal well, [illegible] generally very little incapacity for work afterwards. [illegible] faulty union and excessive callus formation may leave [illegible] as a result. If incapacity occurs on raising the arm,

MICROCOPY RESOLUTION TEST CHART



or reduce to pain it may be reduced at from 20 to 50 per cent. or even more. Vastean statistics in a record of 1115 cases of fractured ribs, show 806 complete recoveries in periods up to seven months.

Fractures of the Pelvis.—Fractures of the pelvis are frequently complicated with fatal internal injuries. If recovery takes place, pain may be persistent, or it may be elicited by movements, and as a consequence walking may be difficult. Simple fractures of the ilium may unite with deformity causing very little incapacity.

Fractures of the Sacrum may result in great incapacity, particularly if nerves are involved.

COMPOUND FRACTURES.

An interesting table in the A.S.A. Report is the one numbered XXXII, giving comparative results of operative and non-operative cases of compound fractures. As statistics on these fractures are not readily found, the schedule set out is significant, though the number of cases is disappointingly meagre.

Humerus (shaft) -	6	83	100	4	100	100
Radius (shaft) -	2	100	100	1	100	100
Ulna (shaft) - -	1	100	100	2	100	100
Radius and ulna	6	83	100	4	100	50
Femur - - -	38	73	76	20	80	70
Tibia (shaft)	22	59	68	34	61	64
Fibula (shaft) -	4	50	100	6	50	16
Tibia and fibula -	50	60	60	82	65	68
Totals - -	129			153		

Observe that the percentage of good functional results is higher in the patients operated on, except in compound fracture of both bones of the leg; in the non-operative cases there is a higher percentage of good anatomical results. This is contrary to the established canon that good anatomical results are followed by a high percentage of good functional results; but it must not be taken that operative treatment is the best treatment in compound fractures. It is generally known that the occasional fixation of a compound fracture by means of a plate and screws has been followed by very good results. Yet it is certain that a universal adoption of this method would be followed by a high percentage of bad results.

The average duration of incapacity was noted in 51 cases.

Femur	13 months	
Leg	"	"
Upper extremity	4	"

There was no marked difference between operative and non-operative [illegible]

In an interesting article on fractures of bones in gold mining by [illegible] W. Freeman,[18] there is a useful note on fractures from an economic [illegible]nt. The mining company pay their workers an averag[illegible] $3·25 per day. If a workman is injured, for every dollar the [illegible]n wages the company spend a like amount to get him well. [illegible] injured, his pay stops, but he draws $1·00 per day from [illegible] Aid Fund, without any expense to himself for surgical services or [illegible] For example, a man loses 100 days, equal to $325·00; he [illegible] $100·00 from the Aid Fund, a loss to him of $225·00; while it [illegible] company $325·00, besides the loss of efficiency in breaking [illegible] man.

In a total of 311 cases of simple and compound fracture, we find the [illegible] losses to the employees and to the company:

			$	$	$	$
[illegible]	25	976	3172	976	2196	3172
[illegible]	1	9	29·25	9	20·25	29·25
[illegible]	1	7	22·75	7	15·75	22·75
[illegible]	4	182	591·50	182	409·50	591·50
[illegible]	1	23	74·75	23	51·75	74·75
[illegible]	25	825	2681·25	825	1856·25	2681·25
[illegible]	1	117	270·25	117	153·25	270·25
[illegible]	1	89	289·25	89	200·25	289·25
[illegible]	5	248	906	248	658	906
[illegible]	7	140	453	140	313	453
[illegible]	39	721	2343·25	721	1622·25	2343·25
[illegible]	6	183	594·75	183	411·75	594·75
[illegible]	10	2137	6945·25	2137	4808·25	6945·25
[illegible]	1	35	113·75	35	78·75	113·75
[illegible]	39	4773	15512·25	4773	10739·25	15512·25
[illegible]	19	1322	4296·50	1322	2974·15	4296·50
[illegible]	18	800	2600	800	1800	2600
[illegible]	4	360	1170	360	810	1170
[illegible]	31	992	3224	992	2232	3224
[illegible]	70	980	3185	980	2205	3185
Totals -	311	14,919	46,365·75	14,919	31,446·75	46,365·75

[illegible] reports on 230 cases of open fracture of the long bones. [illegible] patients an attempt was made to save the limb. The general [illegible]ent was as follows: The limb was thoroughly cleaned, the [illegible] the skin and subcutaneous tissue excised, the soft parts [illegible] and all pockets made accessible; muscle, fascia, [illegible] ingrained with dirt were cut away: the bones, if [illegible] turned out of the wound and dirt removed; large [illegible]nts were cleaned and preserved; fixation by means of wires,

[illegible] patients were employed in some cases and the wounds were [illegible] in possible. Of the 112 cases treated by fixation 9 died from various complications, such as pneumonia, [illegible] Bright's disease, cardiac failure, etc., and considerable amputation was required in 7. Of the 96 patients whose limbs were saved, all recovered with good union. There were 17 patients treated by abandoning fixation, [illegible] of complete bone [illegible] and secondary amputation was required in 7, the [illegible] in the fixation cases. The length of time required for treatment in hospital in these serious cases was [illegible] was in the average 62.7 days, the longest period being 200 days. Friends [illegible] thoroughly believe in efficient splinting and fixation in suitable cases. Where the fixation method is [illegible] in contaminated [illegible] in open fractures [illegible] life, it has caused disaster in [illegible] fractures.

[illegible]

H. A. Gray

FRIEDREICH'S ATAXIA. (See Ataxias.)

FRONTAL SINUSITIS. See Nasal Accessory Sinusitis.

GALL-STONES. We shall impute (1) *Infection* [illegible] of some [illegible] arising from the presence of [illegible] and (2) *Biochemistry* [illegible] of the [illegible] forms of gallstones.

The Prognosis of Gall-stones apart from Operation. [illegible] gall-stones are very frequently found at the post-mortem, their presence was never suspected during life. They are [illegible] present in 4 per cent of all adult males and 20 per cent of [illegible] females and are undoubtedly commoner in big cities. Only a [illegible] of the cases are [illegible] attacks of [illegible] colic.

Moynihan has forcibly pointed out this does not mean that the [illegible] gall-stones never have any symptoms. A large proportion have [illegible] attacks of [illegible] which may [illegible] attacks of pain, not in the right hypochondrium but in the [illegible]. It is not at all uncommon for a very [illegible] attack to be the result and [illegible] the symptoms that the [illegible] have [illegible]. In a considerable [illegible] perforation is found and some of these [illegible] a gastric ulcer in consequence.

Jaundice with or without [illegible] and *pruritus* are quite common evidences of the presence of stones in the [illegible]. There are a number of less frequent [illegible]. In 20 per cent of the cases which are sufficiently severe to [illegible] for operation, a *stone becomes impacted* in the common duct and in a further 10 per cent in the cystic duct (Kehr, Mayo-Robson figures). Stone in the common duct causes persistent [illegible] and pain, and sometimes febrile attacks; stone in the cystic duct gives rise to dilatation of the gall-bladder, either simple or [illegible] infected (empyema of the gall-bladder).

Later trouble resulting from gall-stones may be a *fistulous opening* into the peritoneal cavity, some viscus, or on the skin surface. In [illegible] statistics collected from the literature, there were 184 [illegible] cutaneous fistula (usually at the umbilicus), 119 of perforation [illegible] peritoneal cavity, 83 into the duodenum, 39 into the colon, [illegible] the lung, and a very few each into the stomach, kidney, and [illegible]. In 4 cases (one of whom was Ignatius Loyola) the internal [illegible] was opened by a gall-stone fistula.

[illegible] *cholecystitis* is a quite common consequence of stones in the [illegible] bladder, and occasionally leads to perforation and peritonitis [illegible] abscess or abscess of the liver may also result.

[illegible] *intestinal obstruction* due to gall-stones is rare, but many hundreds [illegible] are on record. Of 280 in the literature, 156 died (Martin). [illegible] literature statistics are seldom very valuable. Occasionally [illegible] around the bile passages may lead to intestinal obstruction [illegible] of the bile-ducts or gall-bladder is a well-recognized consequence [illegible] of the long-continued irritation of calculi. We have some [illegible] giving us an idea of the frequency of this result. Cancer was [illegible] in 18 out of 409 cases at the London Hospital, and 45 out of [illegible] at Guy's. The greater frequency is due to the older date [illegible] statistics; nowadays many more cases are operated on early. [illegible] these figures, we obtain a frequency of 8 per cent [illegible] the

ancient statistics of Riedel were as high as 28 per cent. It will be seen, however, that the danger of cancer is by no means negligible at even 8 per cent of patients with symptoms authentically severe to be attributed upon already show it. Walton records 3, and Mayo Robson and Lawford Knaggs 1 each cases in which cancer has supervened after operation, but this is evidently extremely rare. In the recent statistics of Kehr, Dietz, Arbeiter, McWilliams, Stanton, and the Bristol series, comprising nearly a thousand in all, this equal is not once mentioned.

We conclude, therefore, that in the majority of cases the presence of gall-stones leads to some discomfort, which in about one-fifth of the cases is very severe, though it may be only temporary; that of those in whom cholelithiasis is definitely diagnosed, about one-third eventually suffer from impaction of a gall-stone, or develop a fistula or acute cholecystitis demanding prompt interference; that another 8 per cent go on to cancer of the bile-passages, and that a small proportion, perhaps 1 per cent, lose their lives from intestinal obstruction, perforative peritonitis, pancreatitis, or subphrenic abscess.

It is scarcely realized by the profession that the prognosis of gall-stones, apart from treatment, is as grave as these facts prove. It will probably be admitted by nearly everyone that the prospects of permanent relief of symptoms by medical treatment—olive oil, salines, mineral waters and spa treatment, dieting, etc.—are very slight, and any patient who has had one attack of hepatic colic will most probably get others. Fortunately these are often at long intervals, so that life may be tolerable notwithstanding.

B. **Prognosis of Operation for Gall-stones.** We shall consider, first, the operation mortality and its causes, and then the prospects of permanent cure.

Table I.—The Operation Mortality for Gall-stones.

D'Arcy Power	73	23·3	53	14·5			20	55
Kehr	1600	16·5	691	2·9	389	3·3	520	44·6
Mayo	1500	4·4	1164	2·5	105	2·9	102	24
Bristol Royal Infirmary	84	13	31	9·6	27	11	12	42
Aggregate	230	6·9						
Mean	200	6						

1. *Operative Mortality.*—As a glance at *Table I* will show, it is impossible to give a figure for the death-rate of the operation for gall-stones which will not be utterly misleading if applied to particular cases without discrimination. All depends upon the exact nature of the individual's condition.

absolutely straightforward, uncomplicated cases, the mortality is low. D'Arcy Power records 27 such without a death: Kehr's statistics of 2494 operations of this type with a mortality of [illegible] cent. On the other hand, in the presence of serious complications including cancer, peritonitis, infection with fever or pus, liver, etc., most of the statistics range about 50 per cent.

Table I we are able to give in some detail four series of recent [illegible]. D'Arcy Power quotes 73 cases under his observation in St. Bartholomew's Hospital from 1900 to 1912. The total mortality (23·3 per cent), because in England it is principally the severe complicated cases that are sent to a hospital. He does not distinguish between stones in the gall-bladder and in the ducts. The Royal Infirmary figures, representing the practice of nine [illegible] during the years 1900-1911, are very similar, but present a [illegible] proportion of serious complications, so that the total death-rate is much less. It will be observed that even in the absence of such complications, about 1 in 10 die.

[illegible] of Halberstadt, who performs an enormous number of operations for gall-stones, can quote 1600 cases, his total death-rate being [illegible] higher than that in the Bristol series, but in uncomplicated cases results are much better, the mortality being 2·9 per cent if stones are in the gall-bladder and 3·3 per cent if in the ducts. Statistics run over twenty years.

Mayos also record a long series, and they appear to deal with a simpler type of case than the English or German material, so their total death-rate is only 4·4 per cent. Their figures in uncomplicated cases are a little better than Kehr's, and much better than English. There is little doubt that when it becomes the rule to call the surgeon early instead of late, the death-rate will fall considerably. In the Bristol figures, for instance, it was very remarkable to see how the formation of adhesions affected the prognosis. Of [illegible] with extensive adhesions, 30 per cent died.

[illegible] the figures, the common-duct cases show a mortality rather [illegible] than those with stones in the gall-bladder only. Cholecystectomy is more severe than cholecystotomy; thus:

	Mayo	Kehr
[illegible]cystotomy	845 cases; 2·1% died	307 cases; 2·2% died
[illegible]cystectomy	319 cases; 3·1% died	384 cases; 3·3% died

[illegible]sonal risk is due, not so much to the added severity of the [illegible], as to the fact that the necessity for removal shows a more [illegible]ated type of case, at any rate in the hands of the above-[illegible] surgeons. Of 12 cases of stone impacted in the [illegible] the Bristol series, none died.

The causes of death are illustrated by the Bristol statistics—heart, 3 cases; peritonitis, 3; septic shock, 2; fatty heart twenty-one days after, 1; pneumonia, 1; cut posted vein, 1; intestinal obstruction, 1. Cannon also accounts for some fatal results. A few produced patients died of persistent hemorrhage. Some writers describe a post-operative cessation of the hepatic functions, characterized by absence of bile, fever, vomiting, and death. Both Kehr and D'Arcy Power think that the mortality is much higher in males than females, being approximately double.

2. *The Prospect of Cure.*—We have available several series of end-results of cases followed for periods varying from one to ten years after operation, and representative English, German, and American practice. Kehr and Davis also give figures, but the first are not followed long enough and the second are too vaguely expressed. In the table, all forms of operation for gallstones are classed together.

Table II.—Prospects of Relief after Operation for Gallstones.

Anspeger	147	64·6	19·7	6·9	8·8	
McWilliams	68	66·2	10	23	9	18
Stanton	245	79	15	6	3	2
D'Arcy Power	20	70	.	20	10	0
Bristol Royal Infirmary	59	52·5	32·2	15·2	5	6·7

Anspeger records the cases operated on at Heidelberg in the years 1907-1909, it being customary to remove the gall-bladder. Both he and Davis specially warn against stitching the gall-bladder to the abdominal wall. It will be seen that about two-thirds of the patients were cured and only 6·9 per cent were unrelieved. McWilliams's figures are rather older (published in 1906), and there is a high proportion of cases not benefited, or requiring a second operation. Stanton gives the end-results from Ochsner's clinic, where the results are much better, perhaps on account of earlier operation. D'Arcy Power's cases are few in number, and many of them were operated on late in the disease. The Bristol figures are from the same series as was quoted under the heading of mortality, and show only about half cured, but another third improved; perhaps the difference between this and the other reports is principally in the use of the word 'cured,' which in the Bristol table is taken to mean absolute freedom from symptoms.

Taking all together, we may conclude that about 85 per cent are cured or relieved by operation, and the remainder, about 15 per cent, are not improved. What are the causes of lack of success? Principally three: (*a*) Recurrence of the stones; (*b*) Adhesions; and

[illegible] Second operations have [illegible] been performed [illegible] of these. Thus

[illegible]	11	[illegible]	13
[illegible]	8		4
[illegible]	8		10
[illegible]	1		[illegible]

[illegible] fore, are rather commoner. It is very difficult to [illegible] the gall-stones are new formations, or stones overlooked [illegible] increased in size since the first operation; probably the [illegible] Adhesions may produce symptoms exactly like [illegible] Second operations in this class are not often [illegible] worthy that there is sometimes an attack of severe pain [illegible] after the operation which therefore appears to have [illegible] by permanent cure. This is noted by Munro, and was [illegible] Bristol cases. It is probably due to catarrh of the duct [illegible] the gall-bladder is not a certain preventive of re-formation [illegible] Arnsperger relates three cases in which they recurred [illegible] duct. Incisional hernia is quite a common sequel, the [illegible] from 3 to 10 per cent. It often gives but little trouble. [illegible] much difference in the end-results whether the stones [illegible] bladder, the cystic duct, or the common bile-duct. In [illegible] ries, the common-duct cases gave the most failures, whereas [illegible] series there were very few of these who did not get relief [illegible] factor in determining the end-result is the amount and [illegible] adhesions found. In the Bristol cases with extensive [illegible] 6 out of 19 died and 36 per cent were unrelieved, whereas [illegible] ence of adhesions only 10 per cent failed to obtain benefit. [illegible] ports that of 107 uncomplicated cases of stones in the gall- [illegible] 5·4 per cent were unsatisfactory.

[illegible] ade, therefore, that in simple, early cases the mortality of [illegible] about 3 per cent, and that 90 to 95 per cent will be greatly [illegible] that in the type of case usually operated on in England [illegible] or years of recurrent gall-stone colic, 10 per cent die and [illegible] per cent of the survivors are relieved; and that in cases [illegible] complications such as infection, perforation, cancer, etc. [illegible] per cent die, and relief is likely to be incomplete in most of [illegible] ds. It is evident, therefore, that to obtain the best results [illegible] eration for gall-stones, it ought to be undertaken decidedly [illegible] as now the custom. For this reason, the figures of a few [illegible] American surgeons are better than those of average [illegible].

Arnsperger, *Munch. med. Woch.* 1912, lix. 6; Davis, *Surg. Gynec. Obst.* 1912, xv. 27; Kehr, *Munch. med. Woch.* 1910, s. 1986; Kehr, [illegible] *Rev.* 1908, [illegible] 422; Mayo, [illegible] 1909, 209; McWilliams, N.Y. *Med. Jour.* 1916, lxxxiii. 1109; [illegible] *Med. and Surg. Jour.* 1909, clx. 359; D'Arcy Power, *Brit. Jour.* [illegible] 21; [illegible] *Brit. Med. Jour.* [illegible] *Jour. Amer. Med. Assoc.* 1911, lvii. 441; Walton, *Ann. Surg.* liv. [illegible]

A. Rendle Short.

GANGRENE. [illegible]

[illegible]

We [illegible] *1. Prognosis as to the limb. 2. Prognosis as to the life of the patient, and 3. Prognosis following the treatment.*

1. **Prognosis as to the Limb.** It is [illegible] difficult to be [illegible] exact. Low [illegible] of a limb is irretrievably affected. Sometimes the skin turns brown but the deeper structures are living. When however the discoloration appears to be deep seated and the tissues round the foot is painful or no longer sensitive to pressure, it is beyond recovery. If a line of demarcation forms, it is no use to expect [illegible] to cases that this will be the limit of the advance of the gangrene. Though in [illegible] or embolic gangrene, or in cases of frost-bite where the artery is blocked at a particular point, the disease does not usually spread above a line of demarcation. In such cases one [illegible] after a whole a spreading disease even above the line, and the process gradually advances up the leg if it is allowed to do so. The writer recollects seeing in a workhouse an old pauper who developed gangrene of the toe, which extended in the course of years up the leg to the middle third of the thigh: but for seven years he persistently refused amputation and still retained possession of his dry, black, stinking leg! Such a case is unusual most patients would have died of septic intoxication long before.

In any case it is possible to foretell how much of a limb is in danger by feeling how far down the arteries can be found pulsating and by taking a skiagram to see how far up the vessels the calcareous changes extend.

2. **Prognosis as to Life.** This is usually grave in an untreated case, and depends upon the rapidity of advance of the gangrene, the age and condition of the patient, and the degree of septic absorption. Much sugar in the urine makes the outlook more ominous, and if there is a good deal of fever, and the dead area is moist, nothing but early amputation is likely to save the patient's life.

3. **Prognosis as influenced by Treatment.**—It is quite useless, in a senile or diabetic case, to amputate at the site of any line of demarcation that may have formed. Nor has the operation of making an anastomosis between the femoral artery and vein met with success save in a very few exceptional cases. The treatment remaining therefore is to amputate through the lower third of the thigh or in early cases with pervious arteries, at the site of election. The amputation conducted under such circumstances is by no means a

[illegible] 68 cases [illegible] treated at the London Hospital, the [illegible] St. Thomas's from 1907 to 1914. 16 died [illegible] mortality of 41 per cent. [illegible]

GAS GANGRENE.—Gas gangrene is a clinical term used to [illegible] spreading infection commencing in damaged muscle and due to [illegible] or more varieties of anaerobic bacteria, of which the most [illegible]rtant is the *B. perfringens* or *B. welchii*. At the beginning of [illegible] war the disease was little known, and [illegible] in its consequences; [illegible] multiplied experience has come greater knowledge and [illegible] more methods of treatment, rendering the prognosis much [illegible]. The prognosis depends upon many factors, of which the most [illegible]rtant are indicated in the headings of the paragraphs below.

[illegible]aerobes are abundant in the highly fertilized soil of Flanders [illegible] Southern France. They are carried by projectiles into a wound [illegible] the trench mud that clings to the clothing and skin of the [illegible]r. Faecal contamination of the clothing and skin of the body [illegible] and thighs is another source of infection of a wound with [illegible]robes.

Characters of the Wound.—The severity of the infection varies [illegible] the character of the wound. Gas gangrene is primarily a disease [illegible] muscle. Hence projectiles such as ragged fragments of shell [illegible] causing, by causing extensively lacerated wounds of muscle, are [illegible] often followed by gas gangrene than are the wounds caused by [illegible]ed balls or undistorted rifle bullets.

[illegible]portant injury to a large artery, such as the popliteal, [illegible] prognosis graver.

[illegible] fractures are associated with considerable tearing of muscle [illegible] with the formation of large haematomata, and are therefore [illegible]able sites for the disease.

Types of Disease.—Gas gangrene may start acutely, and run a [illegible] quickly-spreading course; or it may begin subacutely, remain [illegible] for some time more or less localized. In the fulminating cases [illegible] may occur in from twenty-four to thirty-six hours.

[illegible] subacute case is the type for which local surgical measures may [illegible]ployed, while amputation is nearly always required to save life [illegible] acute type.

Stage of the Disease.—The prognosis becomes rapidly graver with [illegible] time the disease has been established before the patient [illegible] treatment. An amputation, however, will frequently succ[illegible] [illegible] performed through crepitant tissues, provided the upper [illegible] infected muscles or group of muscles be properly dealt [illegible]. Results of Treatment.—

[illegible] toxaemia, manifested by extreme pallor, vomiting, and [illegible] small, and occasionally wholly impercepible, radial [illegible] signs of grave import. Amputation is here the only hope [illegible] it is sometimes successful, even in profoundly toxic [illegible]

[illegible]

Site. [illegible]

[illegible]

Shock and Other Factors. Multiplicity of wounds renders the prognosis much worse. When the patient is suffering from shock or collapse the infection tends to run a more rapid course. Any condition (Question) that tends to aggravate circulatory shock or collapse will make the outlook less favourable. Such conditions are (1) The position and character of the wound or wounds; (2) Uncleansed pain from a badly splinted fracture; (3) Prolonged tube-and-pulley apparatus; (4) Exposure to cold and inclement weather; and (5) Anæmia from excessive bleeding.

Wounds of a large artery, resulting in the cutting off of the blood supply of the wounded muscle, tend to be frequently followed by a gangrene, sometimes involving the whole limb below the vessel in lesion. The popliteal and posterior tibial arteries more commonly, and the femoral arteries less commonly, are the best instances of this.

Results of Treatment. Briefly the essentials of treatment are: the making of adequate incisions, thoroughly exposing the limits and extent of the wounds in the muscle; the removal of foreign bodies over the skeleton; the excision of infected muscle and muscle likely to become infected; the provision of good drainage; and the adoption of certain methods of post-operative dressing.

The success of local excision of muscle in the early stages depends on a knowledge of two main principles: first, that spread of the disease takes place in the length of the muscle infected, whereas spread across between neighbouring groups of muscles, or even contiguous unwounded muscles of the same group, is rare; secondly, that all infected muscle must be removed as thoroughly as possible. In the early stages, infected muscle is a dirty brick-red in colour, does not contract to

[illegible]

[illegible] operation [illegible] ... The operation should be performed [illegible] ... When [illegible] possible [illegible] ... of the [illegible] ... The amputation must be [illegible] ... B.I.P.P. [illegible] ... left behind in the stump.

[illegible] important to emphasise the fact that [illegible] the subcutaneous [illegible] contraindication for the performance of an amputation [illegible] supra-crepitant tissue. If the source of the gas [illegible] infecting muscle is removed, the subcutaneous emphysema [illegible] frequently disappear under the influence of multiple small [illegible] When the skin passes through the creamy brownish colour [illegible] described below. For instance, through a wound of the [illegible] femoris may become gas-infected and gas may spread well [illegible] Poupart's ligament; an amputation high up in the thigh, with [illegible] of the crepitant tissues above, will sometimes give relief.

The colour changes in muscle, described by Cuthbert Wallace, [illegible] pathological rather than prognostic value. The colour changes [illegible] skin are, however, of somewhat more moment. The pallor and [illegible] of the initial stages are due to tension over the swelling part [illegible] vary in their appearance. Where a limb becomes massively [illegible] crepitant and toward a fulminating form, the skin becomes [illegible] purple, then to black. Blebs of blood-stained fluid form [illegible] expose a raw purplish area. Dead-white patches are inter[illegible] with the purple. When this condition is seen, amputation [illegible] indicated. A brownish-cream-coloured spreading [illegible] the skin and subcutaneous tissues occurs in the subacute [illegible] of the disease. It is not of grave import, but should be treated [illegible].

[illegible] methods of dressing the wounds after operation, Carrel's [illegible] takes the first place. Eusol, Dakin's fluid, brilliant green [illegible] have all been used as instillations. The writer is much [illegible] with the excellent results obtained from the two last. [illegible] excellent application. The salt pack is still extensively [illegible]. Where much muscle has been resected, efficient [illegible] should always be provided.

The [illegible] tables have been compiled from a consecutive series [illegible] cases that passed through the operating theatre of a casualty

[illegible] stations. The mortality is probably low, in that it represents only the mortality after operation. Certain cases admitted are too ill for operation, and these are not shown in these lists.

The term "recovered" is used to denote patients sufficiently recovered to leave the hospital. Here again the other, the end mortality may be slightly higher than stated. By the term "conservative operation" is meant an operation where the wound was opened up.

Table I. Mortality of the Two Main Types of the Disease.

Head and neck		1	1		2
Scapular region			1		1
Chest wall			1		1
Abdominal wall			1		1
Back			1		1
Upper arm	1		7		11
Forearm	5		2		7
Buttock		1	3		4
Thigh	12	11	22		45
Leg	17	6	23	2	48
Foot	1		8		9
	Mortality 48·72 per cent		Mortality 2·86 per cent		131

Table II. Results of Methods of Operation in Relation to Site.

Head and neck	1	1				
Scapular region	2					
Chest wall	1					
Abdominal wall	1					
Back	1					
Upper arm	5		4		2	
Forearm	12		7			
Hand			1			
Buttock	3	1				
Thigh	25	1	6	8	4	3
Leg	32	1	12	4	5	3
Foot	6	1	3			

[illegible] III.—Results of Methods of Operation in Relation to Type

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	7	2	25	11	9	6
[illegible]	63	1	6	1		

[illegible] and other obviously devitalized tissue excised, and [illegible] provided for. Cases under the heading 'Requiring [illegible] Operation' were those in which an original 'conservative [illegible] was performed, which was followed in from one to three [illegible] amputation or multiple incisions on account of further [illegible] disease. *C. H. S. Webb.*

GASTRIC ULCER.—(*See* Stomach, Diseases of.)

GASTRITIS.—(*See* Stomach, Medical Affections of.)

GENERAL PARALYSIS OF THE INSANE.—(*See* Mental Diseases.)

GENU VALGUM.—In young children with rickety deformities, this [illegible] may improve in the course of years, with splints and a more [illegible] but in older children and young adults the deviation [illegible] is likely to be permanent, and may increase up to the [illegible] growth ceases. The success of treatment depends much [illegible] skill of the individual surgeon, but it is usually possible [illegible] an excellent result at a small risk by the Macewen operation, [illegible] a wedge out of the tibia. *A. Rendle Short.*

GENU VARUM.—(*See* Rickets.)

GLANDERS.

Acute Glanders.—This is an extremely fatal disease; the mortality [illegible] 90 per cent. Death occurs in from one to three weeks. Only [illegible] is localized and no internal organ is affected can a favourable [illegible] be hoped for. The appearance of a pustular eruption [illegible] ominous.

Chronic Glanders.—Half of these cases are fatal. In this form, too, so long as the disease is localized and the internal organs are not [illegible], recovery may result. But the course of the disease is always [illegible] the patient is always subject to the risk of the occurrence [illegible] acute attack. *E. W. Goodall.*

GLYCOSURIA.—(*See* Diabetes Mellitus.)

GOITRE.—Swelling of the thyroid gland may be due to a variety of causes, of which the following are the most important:—(1) *Parenchymatous goitre*; (2) *Adenomatous and cystic goitre*; (3) *Malignant goitre*; (4) *Malignant goitre*; (5) *Exophthalmic goitre*.

1. **Parenchymatous Goitre** usually attacks older children or young adults, advances to a certain extent, and then becomes stationary for the rest of the patient's life. Not uncommonly, however, it may increase growth and produce marked pressure symptoms even in adults. Sometimes a goitre appears rapidly and increases at a great rate, causing considerable dyspnœa.

2. **Adenomatous and Cystic Goitre** do not usually show the same tendency to arrest, but very gradually increase in size. Hæmorrhage into a cyst may bring on urgent dyspnœa.

The prognosis as regards life in these three conditions is almost always favourable. Suffocation from pressure on the trachea only in quite rare cases comes on so rapidly as to be dangerous. Apart from operation of course, some patients would pass gradually into a very grave condition from forced compression of the air passages. A few simple goitres in elderly persons assume malignant character.

Spontaneous cure is not to be hoped for, except in quite recent cases in young adults or children. Lozenges of thyroid extract will aid in bringing this about, but if the swelling has persisted many months they usually fail. If they are going to do any good, the benefit will be evident within a month. It is often desirable to change the supply of drinking water or boil the water.

In rare cases of goitre the internal secretion of the thyroid becomes deficient, and myxœdema ensues. More commonly it is excessive, with mild symptoms of Graves's disease.

The children of goitrous mothers suffering from deficient thyroid secretion are apt to be goitrous. Congenital swelling of the thyroid is almost invariably associated with goitre in the mother, and the child may be a cretin. In the great majority of cases of goitre in women there is no thyroid insufficiency, and the children are therefore normal.

The prognosis after treatment by operation is very favourable. Only a small proportion of cases need be operated on, marked deformity or dyspnœa being the principal indications, and "there is never too much dyspnœa" for the operation to be done (Berry).

The operative mortality is very low. At the Bristol Royal Infirmary during the past three and a half years 59 operations have been done without a death. Kocher's mortality is 3 in 1000. Of 267 innocent cases Berry lost 3: 2 during or shortly after and 1 of pleurisy following operation of four hours. A general anæsthetic, usually open ether, was used. Notes of two cases developed tetany or myxœdema, which in previous days, when almost all or nearly all of the thyroid gland was removed, were both fairly frequent. Tetany is not entirely banished, however, and a number of moderate operations have been less fortunate than Mr. Berry, and can report a case or two. It appears to be due to removal

principal functioning parathyroid gland lying behind the
It is not usually very serious, even if it does occur. There
small but not negligible, of death from haemorrhage; I have

results, provided an adequate removal is made, are most
In Mr. Berry's tables, 222 out of 274 are perfectly
as the goitre is concerned (traced from one to five years,
than one year). In two cases the growth, though
extending, and in one stridor persists. The others are
ight of, or some swelling remains.

Papilliferous Goitre is by no means so favourable in prognosis,
malignant growth, but there is a considerable tendency to
e. Five patients came under Mr. Berry's care; 1 is lost
and 2 were cured, but in 2 others the growth continued
and they returned for operation after operation for several

Malignant Goitre is uncommon, and the prognosis is very grave
oth as regards the immediate and the ultimate results. It
the larynx and its nerves early, and causes secondary glands
k. Of 7 cases in Mr. Berry's statistics, 3 died after the
1 is lost sight of, and the other 3 died of recurrence twelve,
nd sixteen months later.

Exophthalmic Goitre.—This is discussed elsewhere (*see* EXOPH-
GOITRE).

Berry, *Proc. Roy. Soc. Med. (Surg. Sect.)*, 1908, i, pt. 3, 21.
I. *Beddie Shore*.

GONORRHŒA.—The principal object in the treatment of gonorrhœa
nt the spread of the infection to the posterior urethra, since
prospect of serious complications if the disease is confined
terior part of the urethral mucous membrane. Formerly
commended that local treatment should be postponed until
sidence of the acute stage a most pernicious doctrine, as
coccus was thereby enabled to make its progress unchecked
posterior part of the urethra.

patient is seen in the incipient stage of the disease, attempts
made to abort it, and to destroy the gonococcus before it has
spread far down the urethra. This is best effected in the
manner: The anterior urethra is first cocainized by a solu-
and adrenalin, and a urethroscopic tube subsequently
l to its full extent; down this tube a pledget of cotton-
ted with a solution of nitrate of silver, 10 gr. to 1 oz.,
introduced on a holder, and the whole of the anterior urethra
swabbed out. The reaction may be severe, but it usually
a short time, leaving a watery discharge which clears up
four days. But it is seldom that the disease can thus be
in its early stages, and when once the prostatic urethra has
by the gonococcus, the patient is liable to complications,
rded prognosis must be given.

When the whole urethra is affected, treatment by irrigation or injections must be adopted; the modifications of nitrate of silver, such as protargol, argyrol, argaldin, or ichthargan, have a destructive effect on the gonococcus, and should be employed as long as that organism is present in the discharge; astringent injections, such as sulphate, permanganate, or sulphocarbolate of zinc, may be used alternately with the silver salts; at the same time a rigid abstinence from alcoholic liquors should be enforced, and no violent exercise should be taken. A long continuance of the discharge, or frequent reflections, may give rise to peri-urethral thickening, which contracting forms a stricture, the dilatation of which will often be followed by a recursion of the discharge.

If the posterior urethra is attacked, the complications to which the patient is liable are more numerous and more serious, and will necessitate a guarded prognosis as regards ultimate cure.

Epididymitis is a most serious complication, since by it the function of the testicle may be destroyed, and cases of double epididymitis must be looked upon with gravity, since this condition is responsible for a large number of cases of sterility. With a view to preventing this possible contingency, the most careful treatment is required until all traces of the thickening of the epididymis have subsided; this is effected by means of pressure and heat, best applied by means of a Julien's bandage. No positive opinion as to the patient's matrimonial prospects should be given until an examination of the semen has been made and the presence of active spermatozoa ascertained. Prostatitis, either acute or chronic, is a further complication of the disease; the prognosis of acute prostatitis is good, and the condition usually subsides in a week or ten days, though it may form an abscess which will require to be opened.

Chronic prostatitis is a common complication of a posterior gonorrhœa, is a most difficult condition to treat satisfactorily, and is responsible for a large number of cases of sexual hypochondriasis. Massage of the prostate gland per rectum, and subsequent instillations into the prostatic urethra of 20 min. of solution of nitrate of silver, 5 to 20 gr. to 1 oz., by means of a Guyon's syringe, is the treatment from which the most satisfactory results may be expected.

Seminal vesiculitis is a not infrequent concomitant of chronic prostatitis, and may yield to similar treatment, though massage of the seminal vesicles is a more difficult procedure than is that of the prostate. In this condition, catheterization of the common ejaculatory ducts through the urethroscopic tube has been recommended and carried out with success, but this is a process of considerable difficulty, and one requiring much technical skill.

Cystitis is another complication of posterior gonorrhœa, and is commonly located at the neck of the bladder, although the whole of the vesical mucous membrane may be affected. Treatment by rest in bed, by the administration of balsamics, urotropine, and helmitol internally, and later by irrigations of the bladder with weak

[illegible] conditions, will usually ensure the disappearance of this [illegible] but occasionally the infection spreads upwards to the pelvis [illegible] a region in which local applications are not available [illegible] means of the ureteric catheter.

[illegible] ophthalmia in the new-born or in the adult is a most [illegible] application, but is one which usually yields to treatment by [illegible] applications of nitrate of silver solution or its modifications [illegible] argyrol, followed by astringent lotions and the application [illegible]. The prophylactic treatment of the sound eye is a [illegible] accompaniment of the treatment. Ophthalmia neonatorum [illegible] which should be averted by prophylactic measures, but [illegible] which, when recognized early, should yield to applications [illegible] of nitrate of silver or of its compounds.

[illegible] to the complications of gonorrhœa due to a direct infec[illegible] the gonococcus, there may be a systemic infection from [illegible] or from its toxins, giving rise to gonorrhœal arthritis, [illegible] lo-choroiditis, endocarditis, pericarditis, pleurisy, per[illegible] meningitis, really forms of gonorrhœal septicæmia [illegible] the systemic manifestations of gonorrhœa rather than in the [illegible] that vaccine therapy is chiefly indicated, though it has been [illegible] beneficial in all stages of the disease. Either stock or [illegible] vaccines may be used, but in either case their introduction [illegible] be followed by both local and general reactions, the local [illegible] testing themselves in redness and swelling at the site of [illegible] and the constitutional ones in rise of temperature and in an [illegible] pain in the region affected by the gonorrhœal invasion. In [illegible] rectal injections of antistreptococcic serum yield most [illegible] results in cases of gonorrhœal arthritis or other forms of [illegible] 10 c.c. of the serum being introduced per rectum daily [illegible] eight or three weeks. Intramuscular injections of the soluble [illegible] mercury, especially of hydrarg. succinimide gr. ¼, twice weekly, [illegible] been productive of most satisfactory results. The prognosis [illegible] arthritis must be a very guarded one, as, in a certain [illegible] of cases, the affected joints are permanently injured, and [illegible] of movement will be the result. In addition to the [illegible] treatment, local measures such as Bier's passive congestion [illegible], and in the case of the knee-joint, early aspiration may [illegible], followed by counter-irritation and passive movement.

[illegible] of the seminal vesicles has been attended with success in [illegible] gonorrhœal arthitis on the assumption that in the vesiculæ [illegible] the focus of systemic infection, and in justification of this [illegible] severe operation it is undoubtedly the case that seminal [illegible] is a frequent accompaniment of gonorrhœal arthritis.

I. Ernest Lazo

GONORRHŒA IN THE FEMALE.—Before considering the results [illegible] in particular sites it will be well to make a few [illegible] on gonorrhœa irrespective of the localization. Speaking [illegible] the ill effects are less obvious than in the case of the male.

[illegible] and [illegible], especially when, as happens in at least 50 per cent of all cases, the infection reaches the ovaries and [illegible] tubes. Chronic tubal lesions in the urinary tract are [illegible] in complexity. The lower genital tract is little liable to chronic pelvic lesions, and when attacked readily recovers. In the [illegible] of [illegible] infections, no definite opinion concerning ultimate [illegible] can be based on individual cases, under pallia[illegible] the treatment the [illegible] has become [illegible] at the end of a fortnight, and the prognosis [illegible] with the lesion then present and [illegible].

Gonorrhœa and Sterility. It is estimated that 70 per cent of all sterile marriages are the result of gonorrhœa, either on the husband, the wife, or both. Of women who have had gonorrhœa it is hazarded that 50 per cent are sterile. Otherwise sterility is pretty generally regarded as resulting from the extension of gonorrhœal infection during the puerperium.

Giles found that in 100 cases he operated upon for pelvic inflammation or tuberculosis, and were under forty years of age and married, 25 per cent subsequently became pregnant. Of these, 19 women had 25 children, and 5 other women had miscarriages.

Noble noted that in 65 cases treated surgically, but none of which were tuberculous, 17 of these, under forty years of age, became pregnant, and 4 others had miscarriages.

The chance of infecting the child when gonorrhœal women bear children is to be regarded as serious. It is variously estimated that 10 to 30 per cent of all blindness in the world results from this cause.

Prognosis as affected by Treatment. Chief interest in the treatment of gonorrhœa centres round the different methods adopted, whether reliance is to be placed upon vaccines, or whether the older methods of local application and douches are to be almost the only hope of the physician.

Concerning the value of vaccines, the widest variation in opinion is found both as to their use in general and in localized lesions. The weight of opinion tends to the views that chronic lesions react better than acute; that success is more likely to follow their administration in general infections than in localized lesions; that the vulvovaginitis of children is benefited; and that many cases of chronic arthritis react to vaccines.

Pelvic cellulitis of the tubes or peritoneum does not react to vaccine treatment.

Prognosis in Particular Sites.

Vulvovaginitis. The infection in children is usually acute, and would appear to react better to vaccines than to simple palliative measures.

The following table is taken from Noble, and gives the results of vaccine treatment. The second series in each instance was reported after an interval of five years.—

RESULTS OF PALLIATIVE AND OF VACCINE TREATMENT OF VULVOVAGINITIS IN CHILDREN.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	12	10	2	0
[illegible]	25	0	25	0
[illegible]	67	0	64	1
[illegible]	84	76		5 (& 3 [illegible])

[illegible] shows the comparative results obtained in gonorrhœal [illegible] the adult, according as douching or vaccine therapy was [illegible] and the duration of treatment.

[illegible]IVE RESULTS OF IRRIGATION AND VACCINE TREATMENT OF VAGINITIS IN ADULTS (*Hamilton*).

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	260	158	53	49	60
[illegible]	84	76	5	3	90

[illegible] results in the above tables must be taken as much above the [illegible] and unlikely to follow the administration of stock vaccines [illegible] *mata*. The treatment of condylomata is in general un[illegible]ed, although the larger masses require more extensive [illegible]ation, often at repeated intervals.

[illegible] *s Gland.*—Once infection of the gland has occurred, treat[illegible]s to be prolonged. Often an apparent cure results, within a [illegible]r two, in a recrudescence of inflammation and swelling, with [illegible]t discharge. In the more stubborn cases a Bartholinian cyst [illegible] develops; the results of treatment by excision leave nothing [illegible]red.

[illegible]*tis and Cystitis.*—Although by accurate examination it can [illegible]ned that at least 50 per cent of all cases of gonorrhœa show [illegible]coccus present in the urethra, it is in comparatively few [illegible]es that symptoms indicative of urethritis, and still more rarely [illegible] result from gonorrhœal infection. In all cases simpl[illegible] measures, such as local applications and irrigations, are suc[illegible] Stricture is exceedingly rare as a result. Herman[7] was able [illegible] only eight cases from medical literature, and it is doubtful [illegible] these were certainly gonorrhœal. Balsamic remedies such as [illegible] and copaiba are of no use in women. Alcohol and sexual [illegible]on are conducive to a recrudescence.

In [illegible] the [illegible] in Sloane's tubule [illegible] and their [illegible] by [illegible] disease, which can be readily and efficiently treated by surgical means. Gonorrhœal pyelitis has occurred, also [illegible] but rare.

Cases.—The cases presented the most unfortunate sites in which to have the infection localized, owing to the depth of [illegible] and the [illegible] of [illegible] [illegible] applications entirely fail [illegible] their [illegible].

[illegible] different treatments are [illegible]. The application of [illegible] [illegible] of [illegible] the actual cautery, [illegible] and with pus appears to [illegible] [illegible] in the majority of cases, but the treatment may be necessary for months and even years.

The number of cases of [illegible] in which vaccines have been employed are few, but in some cases in which local applications have failed, the result of a vaccine has been good.

Finally, in certain cases when the tumor is extensive and a definite cystic result [illegible] will be found that the best results follow surgical measures.

Whatever measures are adopted, there usually results a mild chronic cystitis, perhaps [illegible] from superimposed pyogenic infection, with a degree of hæmaturia which may be intermittent or [illegible] an intense from time to time.

Urinary.—Urinary [illegible] usually obscured by the associated pelvic inflammation. The condition results in a few cases in a chronic metritis leading to [illegible] stricture.

Salpingitis and Pelvic Inflammation.—In the acute and especially in the subacute stages opinion is divided as to the value of rest and medical therapeutics. All are agreed that many cases which now come to operation might have been cured by purely medical means if the treatment had been continued some time longer. This is borne out by figures from Prochownick, which we shall quote presently, and a fair comparison can be made with the results of operative treatment.

Kneipp, quoted by Stoeckel, states that of 38 cases treated entirely by pelvic massage, 32 were able to go about their work after a varying period of treatment by rest.

The most valuable figures are those of Prochownick. He treated 160 cases with pelvic massage when necessary, and sent many to sanatoriums for further treatment when thought advisable, and above all, the cases treated were all watched for at least five years. Of 120 cases treated by massage, 100, or 78 per cent., of permanent cures; without any exception the permanent cures were 80, or 19 per cent. Of the 100 cures, 70 per cent. were treated for over four weeks, some of them for six weeks, and later sent to a sanatorium. Of the 160 cures, 85 or 55 per cent. remained well after the one course of treatment; 27 remained well after a second course of treatment; 16, or 10 per cent., had pus collections which were evacuated; 10 required

[illegible] adhesions from three to five years after treatment, one [illegible] parts being removed.

[illegible] practising conservative surgery, had the following results: [illegible] treated, 132; cured, 120. These figures are perhaps optimistic [illegible] and to be cured rather from adhesions producing abdominal [illegible] greater or less severity. Even after operation, adhesions are [illegible]. Where both appendages are diseased and extensive pelvic inflammation exists, it is important that the uterus be either fixed forward or removed; there are numerous instances of surgical [illegible] being regarded as a failure owing to retro-displacement with fixation of the uterus subsequently arising.

[illegible] regards vaccine treatment, Heymann and Moos[10] used vaccines [illegible] cases of acute tubal infection. The results were very good in [illegible] per cent, fair in 41 per cent, and a failure in 20 per cent. All treatment was supplemented by local measures, so that it is not obvious [illegible] is directly attributable to vaccines. In 9 cases of chronic tubal infection there were 7 distinct failures. They state that vaccines were also found useless in cervical and urethral infections.

Peritonitis.—In the pelvic peritonitis which follows acute gonorrhœal infection, the results of surgical interference are so uniformly [illegible] in the early stages, that palliative measures are seldom continued [illegible] there is any fear of the peritonitis becoming general.

[illegible] result of operation in the general peritonitis that ensues upon [illegible] rupture of a tube is more serious, as the following figures show. [illegible] 56 cases: 24 recovered, 32 died. Bonney,[12] 45 cases: 23 [illegible] red, 22 died.

[illegible] further, the earlier the operation the better the prognosis. Of those operated on during the first twelve hours, 14 recovered, 6 died; after [illegible] ty-four hours, 1 recovered, none died; after forty-eight hours, [illegible] red, 4 died.

[illegible] *tis.*—Norris[2] makes the following observations as to the pro[illegible] joint lesions.

[illegible] the acute form of the disease the occurrence of suppuration and [illegible] struction in part of the joint is not infrequent; and in the [illegible] type partial ankylosis is rarer in the case of children. Serous effusions limited to intra-articular structures do best, but even in [illegible] lapses are frequent.

[illegible] quoting and summarizing the results obtained by a whole [illegible] of authors, gives the following figures respecting the results [illegible] vaccine treatment—211 cases: 84 cured, 102 improved, 25 not benefited.

Heymann and Moos[10] think vaccines of great benefit; in 6 cases [illegible] results were: 2 very good, 3 good, 1 failure.

[illegible] opinion appears general that medical and local applications [illegible] be continued during the administration of vaccines in all cases.

Puerperal Infection.—Findley[13] states that 1 case in every 6 is due [illegible] norrhœa. The puerperal infection rarely causes death, but it [illegible] complicated by the presence of streptococci. Often the

[illegible]

[illegible]

GOUT

Acute Gout. [illegible]

Chronic Gout. [illegible] Of the former, the contracted [illegible] The prognosis in these [illegible] is the same whether it is produced by the gouty diathesis or by some other chronic toxic factor. It leads to death mainly along three lines: first, by cardiovascular changes; secondly, by the incidence of superadded, often bacterial, infections; and thirdly, by serious complications. Fifty analyses made by the writer from post-mortem hospital records of 150 consecutive cases of patients who died with chronic interstitial nephritis. The following figures showing the causes of death were obtained: uremia, 21; cerebral hemorrhage, 11; cardiac failure, 11; cardiac failure associated with bronchitis, 7; the supervention of acute nephritis with edema of the lungs, 2; supervention of acute nephritis with uremia, 2; cerebral thrombosis, 1; [illegible], 2; [illegible] of lungs, 2; subdural hemorrhage, 1.

Death occurred in a large number as the result of superadded bacterial infection, thus: 28 died from lobar pneumonia, 3 from bronchopneumonia, 4 from pericarditis, 4 from phthisis, 4 from empyema, 2 from general miliary tuberculosis, 5 from the combination of pericarditis, pleurisy, pericarditis and pneumonia, 1 from pericarditis with pleurisy, 1 from pleurisy alone, and 1 each from pneumonia and empyema, pneumonia and pericarditis, and pulmonary gangrene.

The following percentages are obtained from these figures: death from uremia, 14.7 per cent.; from indirect changes in other organs,

[illegible] infections, 13.3 per cent; accidental [illegible] 5.8 per cent.

[illegible] the question of [illegible] with [illegible] conclusions [illegible] in mind. In spite of all these dangers the [illegible] are impossible [illegible] years.

[illegible] to the prognostic value of [illegible] in the [illegible] the [illegible] significance as [illegible] of [illegible] collateral hemorrhage [illegible] with extravasations [illegible] burst into the [illegible]. These [illegible] most probable due to [illegible] the [illegible] the same outlook as [illegible].

[illegible] to say whether the prognosis of the [illegible] will be materially modified by the use of [illegible] of trauma. *J. R. [illegible]*

GUNSHOT WOUNDS.—The time has not yet come when definite [illegible] can be arrived at as to the prognosis of wounds in [illegible]. Isolated statistics can be collected, but they require more [illegible] discrimination before they can be accepted at their [illegible]. On the following grounds:

[illegible] vary very much in different wars. There is a desert [illegible] and a cultivated-soil type. The first was well illustrated by [illegible] of the South African War, and by the recent Senussi [illegible]. The second includes the surgery of the battles on the [illegible] Belgian front, and to a less extent in the Gallipoli [illegible]. In the former, wounds were usually due to bullets fired [illegible], and soil infection was the exception. In the latter, [illegible] the conditions of trench warfare, shell and shrapnel wounds [illegible] the range of bullets is often short, and soil infection [illegible] clothes or other foreign material is the rule. Soil infection [illegible] streptococci in 80 per cent of the wounds, *B. perfringens* in [illegible] and *B. tetani* in 15 per cent. Virulent streptococcal infection, [illegible] gangrene, tetanus, and prolonged severe suppuration are [illegible] the rule.

[illegible] prognosis has altered very much for the better during the [illegible] the war, partly by improvements in medical organization, [illegible] by advances in surgical treatment. The turning-point [illegible] about Christmas, 1916. It is not too much to say [illegible] difference between war surgery in 1917 and 1915 is as great [illegible] before and after the advent of Listerism in the '70's. The [illegible] means by which the improvement has been effected are [illegible] of antitetanic serum in repeated doses, excision of the [illegible] sterilization by the Carrel-Dakin technique or pastes (Hey's [illegible] + boric acid + paraffin, the flavine substitute, and [illegible] methods), [illegible] suture, [illegible] splinting, and [illegible] surgery. Of these no doubt the most important [illegible] the thorough removal of devitalized muscle, so strongly

[illegible]

[illegible]

Wounds of Soft Parts. Penetrating wounds are more favorable than those inflicted by shrapnel or fragments of high-explosive shell or bombs, and fragments of cutting are followed by grave suppuration in [illegible] proportion to penetration. Large retained pieces of shell almost always give trouble. They usually prevent and interrupt healing, or [illegible] wounds for mechanical reasons. Wounds of the bowel, liver, and [illegible] are particularly apt to give trouble. Lesions within bony cavities [illegible] of the [illegible] are [illegible] [illegible] with thorough [illegible] of dirty [illegible] and [illegible]. This standard with proper antiseptic treatment, the usual disparity can be [illegible] [illegible] the [illegible] and even wounds 10 in. long and

[illegible] Gunshot, the [illegible] should be [illegible] in two to four [illegible]. The unsatisfactory cases are those in which excision is [illegible] impossible [illegible] a long deep track through from the [illegible] the buttock), those in which there are but [illegible] tracks [illegible] of patients suffering from [illegible] shock or loss of blood who [illegible] permit a proper excision.

[illegible] does not appear that the resulting deep scars in muscle give [illegible] neuromuscular trouble afterwards, but at the [illegible] to rest for [illegible] is caused by reason of suppuration, considerable crippling of [illegible] muscles may result.

[illegible] wounds are very [illegible]. Probably nearly all are fatal.

Wounds of Arteries. [illegible] a main vessel in the leg [illegible] popliteal, both [illegible] nearly always leads to amputation [illegible] wounds of the superficial femoral are not so disastrous. In a [illegible] suture or intubation (Jaffe's tubes) has been successful [illegible] popliteal cases.

[illegible] (Aneurysm and Aneurysmal Hemorrhage, see pp. 59–306.)

Nerve Injuries.—The eventual prognosis of nerve injuries due to [illegible] does not appear to be yet worked out.

[illegible] many cases with symptoms of a nerve lesion (paralysis, anæsthesia, wasting, electrical reaction of degeneration), the track of the [illegible] has passed near it, but not through it, and the signs are due to [illegible] or to hæmorrhages on the sheath. Exploration of the [illegible] of the nerve reveals absolutely nothing, as I have more [illegible] verified personally. These cases nearly all clear up in [illegible] three months at the outside, mostly sooner, but a few persist [illegible] longer. Often the muscular response to the Lewis Jones [illegible] better than would be the case if the nerve were divided, [illegible] may be no response at all for a time.

Injuries of the Spinal Cord. The great majority of these injuries [illegible] hopeless from the first, and nothing can be done. There [illegible] early mortality, within a few days; the survivors may [illegible] months or even years, dying at last, usually of septic [illegible] of the kidneys. There is often a little transient and delusive [illegible] in the paralysis or anæsthesia of the legs, one or two [illegible] groups showing some recovery, but not enough to be useful. [illegible] there are a few cases that are capable of better things. [illegible] missile is lying in the spinal canal, it is worth while to cut [illegible] and remove it. Very great relief of pain may be obtained. [illegible] sionally the paralysis may clear up. This is especially likely [illegible] if there is evidence that the spinal cord is not completely [illegible] as shown by presence of reflexes, or an incomplete paralysis [illegible] anæsthesia. Cauda-equina cases also give some room for hope. [illegible] sionally happens that all the symptoms of a complete lesion [illegible] present from the first, when the missile never touched the [illegible] the paralysis is due either to concussion, or to small hæmorrhages. These cases do not always clear up, unfortunately. If they [illegible] to do so, the recovery will take place usually within a few

days, or within a month at the most. Marked wasting of the [illegible] that no further improvement can be expected.

PENETRATING WOUNDS OF THE ABDOMEN

The immediate dangers of wounds of the abdominal viscera are very great; the late dangers are less, much less, for instance, than in the case of the chest or lung [illegible]. The principal risks are death from hæmorrhage or shock during the first two days, and from the toxæmia of intestinal paralysis and gas gangrene during the two days following. There considerable what is [illegible] called late or secondary shock. General peritonitis [illegible] a relatively small part; one does not [illegible] the [illegible] of perforated gastric ulcer, with a [illegible] cold sweat, and stony pit covered by [illegible] with [illegible] Apart from operations, the great majority die [illegible] short time in the second [illegible]. It is [illegible] certain, however, that [illegible] where intestines have been perforated. Col. Wallace quotes some instances. During the South African War it was the rule not to operate, and Malins reported 116 recoveries out of 207 patients. But there is no doubt that owing to transport difficulties a large proportion of the cases never reached the surgeon, and if they did it was too late for operation to do any good. In the Russo-Japanese and Balkan Wars, also, expectant treatment gave the better results.

During the first year of the present War both the British and the French military surgeons adopted the same line of treatment. But already it became manifest that the majority of the patients died from hæmorrhage, and that lives could be saved by early intervention, operation becoming the rule. According to Wallace, the death-rate was about 80 per cent in the pre-operation period (30 per cent out of 1098 died in first ambulances, 56 per cent out of 134 in casualty clearing stations, and a certain number also at the base).

The general mortality amongst cases operated upon is about 50 per cent. Of 959 cases, some operated on and some not, treated at a group of casualty clearing stations during a battle in 1917, 67 per cent died. Of 500 operations, 45 per cent died.

Results of Operation for Penetrating Wounds of the Abdomen.

[illegible]	356	174	48
[illegible]	560	245	49
[illegible]	965	444	46
[illegible]	500	227	45

[illegible] factor influencing the result is the time of operation. [illegible] hours, 105 lived and 107 died; over twelve hours, 20 [illegible] 70 died (Wallace). After 36 hours it is probably better for [illegible] not to be operated on, unless for localized conditions.

[illegible] number of cases still recover without laparotomy, with [illegible] which is supposed to have traversed the viscera. These [illegible] wounds of the upper abdomen involving solid organs. In [illegible] casualty clearing stations during 1917 [illegible] 1,152 patients had [illegible] 74 and were enough to go down to the base.

[illegible] from the general to the particular.

[illegible] wounds appear to be just as serious as those due to shell or [illegible]. Walker gives the following table:

Relative Mortality of Different Projectiles.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	46	68	10	21	40	31

[illegible] of the upper abdomen are less dangerous than those of the [illegible]. Across the chest and diaphragm are also injured. This is a [illegible] combination. Long meandering transverse wounds of the [illegible] abdomen are also very serious. If the bowel is lacerated [illegible] recovery is very improbable.

[illegible] condition and pulse rate are very important guides to [illegible]. If the pulse rate is under 85, three quarters of the cases [illegible]; above 110, the mortality mounts rapidly, and over 120 the [illegible] is 80 per cent (Walters).

[illegible] abdomen in a man who is obviously shot through the [illegible] and to be a certain sign of death.

[illegible] patient arrives exhausted with his rough journey, and [illegible] to wait two hours to see what degree of recovery is [illegible] to remedies—warmth, saline, hot coffee, oxygen, [illegible]. Transfusion may not always be suitable. If there is no marked [illegible] in two hours, the patient will probably have [illegible] or more probably to wait for.

[illegible] of the operation influences the prognosis. Special [illegible] under suitable conditions the results are worth [illegible] to [illegible] of cases are relatively unfavorable. Drainage [illegible].

[illegible] condition, vomiting persisting after the first day [illegible]. The patient will have [illegible] if the bowels are [illegible] three days, has ceased vomiting, the bowels are open and [illegible] evidence of gas [illegible], he has a fair [illegible] 90 per cent [illegible].

Prognosis in Relation to Different Viscera Injured.—In general [illegible]

it is common for several viscera to be injured in the same patient; this of course reduces his chances, but we shall here consider only uncomplicated cases.

RESULTS OF OPERATION FOR UNCOMPLICATED PERFORATION OF BOWEL.

Waters, [illegible]	9	6	66	122	58	47	58	23	39
[illegible]	4	[illegible]	[illegible]	67	46	76	38	20	53
[illegible]	55	29	47	245	85	34	151	63	41
[illegible]	23	10	43	96	37	38	85	37	43
Total	91	45	49	520	213	40	332	143	43

Stomach.—As will be seen from the table, wounds of the stomach are slightly the most favorable, owing to the thickness of the wall and less tendency for a small hole to leak. About half the patients are saved. As Elliott and Henry have shown, there is some danger of late ulceration, hemorrhage, and perforation in the second and third weeks. They suggest that extractives (beef tea, eggs, boiled soups, etc.), which excite a flow of gastric juice, should be avoided in feeding.

Small Intestine.—Forty per cent of the patients with one or more holes in the intestine, but no other visceral injury, have been saved. At special centres (Walter, Lockwood, and collaborators) half have recovered.

The outlook is grave if the abdomen is full of infected blood, and the results after resection are much less favorable than after suture, in all statistics. Thus:

Walter, [illegible]	[illegible]	[illegible]	10 [illegible]	62·5 per cent
[illegible]	58	[illegible]	18	31
Wilson	[illegible]	[illegible]	39	45
	[illegible]	[illegible]	26	22

Resection, as practised, as compared with suture, halved the chances of recovery. No doubt the resected patients were more severely injured on the whole.

There seems to be no difference in the figures for injuries and for [illegible] of intestines. Wounds of the duodenum are very fatal, second only to the pancreas, and is no much about the same.

Large Intestine.—Approximately the same results are found here as in the small intestine. Missed or inadequately closed retroperitoneal wounds are responsible for most of the mortality, the patient

[illegible] sepsis, whereas small-gut cases die of shock, hæmorrhage, [illegible] from intestinal palsy. The patient is often carried off [illegible] by an acute septicæmia, with a pulse rapidly rising to 150, [illegible] temperatures to 40. The *B. perfringens* is responsible for some of [illegible] cases.

[illegible] a Paul's tube or proximal colostomy, is to be avoided if [illegible] as the following figures show:—

[illegible]	45 cases	sutured	21 lived	..	46·6 per cent
	15 ..	colostomy	2 ..	..	13 ..
	102	sutured	50 ..	..	49
	49 ..	gutshot cases	13 ..	..	26
	14 ..	proximal colostomy	4 ..	..	28

[illegible] this must be qualified by allowing that the colostomy [illegible] have been more gravely injured to necessitate it.

[illegible] These are not very favourable. Suture, with a proximal [illegible] probably gives the best results in intraperitoneal cases. [illegible] extraperitoneal wounds it is usual to provide free local drainage [illegible] or inguinal colostomy. About one-third recover.

[illegible] About 40 per cent. recover. The majority die early of [illegible] hæmorrhage; a few succumb later, from sepsis.

[illegible] of Operation for Uncomplicated Wounds of Pelvic Organs.

[illegible]	3	2	66·6	9	5	55·5
[illegible]				13	5	38·5
[illegible]	8	3	37·5	25	11	44·0
[illegible]	10	3	30·0	14	4	28·0
Total	21	8	38·0	61	25	41·0

[illegible] results in intraperitoneal wounds are obtained by suture, [illegible] of the peritoneal pouch between the bladder and [illegible] a catheterized in the bladder. In extraperitoneal cases [illegible] impossible to suture, and free drainage must be provided [illegible] wound track. Opinion differs as to whether it is [illegible] to perform suprapubic cystotomy also.

Wounds of the solid viscera are much less dangerous than [illegible] of the bowel, the principal source of danger being [illegible] with a smaller and later risk from sepsis. In a fair [illegible] two-thirds get well with operation, although some [illegible] complicated cases, and many recover without it. [illegible] tissues infection badly, and any plugged bits [illegible] clothing, are apt to cause serious trouble in left uterus.

[illegible] than 20 per cent. [illegible]

[illegible]

Results of Operations for Wounds of the Solid Viscera

[illegible]	27	[illegible]	[illegible]	11	[illegible]	[illegible]	10	[illegible]	[illegible]
[illegible]	29	[illegible]	[illegible]	4	[illegible]	[illegible]	13	[illegible]	[illegible]
[illegible]	114	[illegible]	[illegible]	32	[illegible]	[illegible]	46	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	14	9	[illegible]	29	[illegible]	[illegible]
Total	203	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	97	[illegible]	[illegible]

[illegible]

WOUNDS OF THE SKULL AND BRAIN

[illegible]

[illegible] majority are instantaneously killed, but quite a large number [illegible] proper medical care. The introduction of the "tin hat" has [illegible] saved many lives.

On arrival at the casualty clearing station or base hospital the [illegible] practice is to operate on all cases unless the patient seems to [illegible], either on account of considerable loss of brain substance, [illegible] of depression, or multiple injuries. Exact statistics [illegible] available, but if no operation is performed, many patients [illegible] meningitis, cerebral abscess, or compression, and those who [illegible] permanent paralyses that might have been avoided. [illegible] shows that the best results are obtained by early [illegible], usually at the casualty clearing station, with excision of [illegible], nibbling away of the bone edges, [illegible] removal of the foreign body if within reach of the finger, and [illegible] depressed bony fragments, packing of the wound, and closure [illegible] drainage. Leaving the wound open leads to [illegible]. Scalp wounds excised, packed, and sutured almost [illegible] heal by first intention. The patient's chances are [illegible] if he is allowed to travel to the base in less than seven [illegible] after operation.

[illegible] regard to the actual number saved, published figures [illegible] and render comparable on account of differences of [illegible] and type of operation.

MORTALITY AFTER OPERATION FOR WOUNDS OF THE SKULL AND BRAIN.

	[illegible]	[illegible]	[illegible]
[illegible] Station, July, [illegible] to Sept. 1917	91	21	23·0
[illegible] France, Sept. 1915	392	58	14·8
[illegible] Hospital, [illegible] 1915	104	19	[illegible]

[illegible] casualty clearing station in France with which the writer [illegible] connected, there were a total of 91 operations on the [illegible], with 21 deaths, between July 1916, and September [illegible]. The Somme battle period is included, and at that time [illegible] cases were sent down without operation. In the period [illegible] almost all patients with [illegible] of the [illegible], if they were not moribund, were operated on. The [illegible] therefore higher than it would be at a base hospital, [illegible] patients [illegible] would be [illegible]. [illegible] base hospital in France, reported on by [illegible] Gray, [illegible] September, 1915, there were 392 operations on the [illegible] with a death rate of 14·8 per cent. As most [illegible] operations were done at the base and at the casualty [illegible]

[illegible] In 12 hopeless cases [illegible] the death-rate was 9 per cent.

At a hospital in Egypt during the Dardanelles campaign, Captain Whitehouse [illegible] 104 patients operated on, with a mortality of 18·2 per cent. Of these 88 had an intracranial injury, whereof 19 died. Of the 64 with intracranial injury who had not previously been operated on, only 9·3 per cent died. At this hospital, flaps were turned down and the wound was left open. Amongst the recoveries there was incontinence of urine in one case, some hemiplegia or hemiparesis in five cases, and lesions of the cranial nerves in two. Six out were completely restored.

Some information is also available with regard to the eventual prospects of these patients. Of course, if a considerable part of the motor centre, visual area, or speech centre is destroyed, there will be experienced impairment, and to some extent the nervous troubles described exist. Hydrocephalus is also met with. In regard to 600 patients examined in England more than three months after being wounded, it is impossible to say how well they had got on. The total death-rate was small: 46 in 1229 cases at eight London hospitals, or 3·7 per cent. Many of these were hopeless from the first, and only 5 died after three months. Many cases evacuated to England with hemiplegia or aphasia improved up to complete recovery, especially when the injury was to the superior longitudinal sinus. Mental capacities also usually improved. Six per cent suffered from fits, but in many of these they did not recur. Headache and emotional changes were common. In 9 patients a missile was still in the brain of these 4 died, one from an unconnected cause. There were fits in 4 cases. Thirty per cent were completely well in all respects; the rest showed various symptoms or were not yet healed. In only 10 per cent were serious disabilities, such as hemiplegia, present. Not many patients, however, were followed for more than a year, and some of those returned to duty have become unfit subsequently.

With reference to the prognosis in individual cases at the casualty clearing station or base hospital, large skull defects, loss of much brain substance, thoughtlessness through brain wounds, and lodgement of metal pieces of steel are all of very bad omen. Symptoms of meningitis, irregular fever, delirium, headlaceration, optic neuritis, the [illegible] and hemiparesis are almost a death warrant. Cheyne-Stokes breathing, or a very high temperature, usually points to approaching death. Prolonged coma, restlessness, and convulsions do not necessarily place some but such patients will probably have marked nervous symptoms for months or years if they recover. On the other hand, patients who are conscious before operation nearly all recover.

Extracranial injuries are much less serious than intracranial, but in a certain number of cases the underlying brain is pulped and may [illegible]. Colonel Gray therefore advises that the dura should be opened even if pulsation is seen not to pulsate, provided

[illegible] operative field has been obtained, and especially if paralysis is present. The purpose is to hasten and perfect the cure by removing [illegible] brain tissue, which may act as a focus of irritation and form [illegible]

[illegible] may summarize as follows:—

[illegible] The majority of cases of gunshot injuries of the skull and brain [illegible] the field, especially the through-and-through wounds of the brain.

[illegible] Of those patients reaching the base hospitals not moribund, [illegible] 90 per cent may be saved by operation.

3. The more severe type of injury met with at a casualty clearing [illegible] can be dealt with successfully in three-quarters of the cases. [illegible] other operation saves more lives, if the patient can be kept [illegible] two afterwards.

[illegible] about 10 per cent of the patients who recover suffer from [illegible] paralysis or insanity, and 6 per cent have fits, often only [illegible] two seizures. A good many show various neuroses such as [illegible] and emotional changes.

[illegible] retained missile does not appear to be very serious if [illegible] survives the first week. The late death rate is very small, [illegible] few suffer from fits. The majority r[illegible] well: a third [illegible] completely cured in three to twelve months.

[illegible] present just after the injury often clear up either early [illegible] after operation, especially when due to injury of the superior [illegible] sinus.

[illegible] Gray, *Brit. Med. Jour.* 1916, i, 261; Whitaker, *Brit. Jour.* [illegible] 1916, April, 708; Sargent and Holmes, *Jour. R.A.M.C.* 1916, Sept.

PENETRATING WOUNDS OF THE CHEST.

[illegible] a sharp distinction must be made between rifle or machine-gun bullet injuries, which are usually small and sterile, and those inflicted by shrapnel, fragments of high-explosive shells, or bombs, [illegible] are nearly always infected. Examination of the chest fluids within the first few days shows that approximately three-quarters of [illegible] cases are contaminated by streptococci, and half by [illegible] bacilli.

[illegible] mortality of all chest wounds in France, up to the middle [illegible] has been about 25 per cent, whereof 20 per cent die at the [illegible] clearing station, field ambulance, or regimental aid post, [illegible] per cent at the base. At one very forward casualty clearing [illegible] 1917 however, the mortality was 30 per cent. Dr. [illegible] in the French army (1916) are about the same. He found [illegible] bullets gave a death rate of 11 per cent, and shell fragments 29 [illegible]

[illegible] cases of pure chest wounds seen at base hospitals in France, [illegible] the following figures:

[illegible] mortality on lines of communication	5·8 per cent
[illegible] in septic cases	40·0 "
[illegible] in septic cases to all	14·0 "
[illegible] of sepsis in cases with effusion	20·0 "

Small In-and-out Wounds. These ought always to do well if the heart, great vessels and diaphragm are uninjured, and unless sepsis occurs. The chief trouble is simple haemothorax. Some of them [illegible] present either a pneumothorax or [illegible] of the chest. Both these latter cases usually recover.

Of cases of haemothorax, if [illegible] statistics show [illegible] sterile [illegible]. Of 40 such cases followed up at least three months after, 24 were fit for duty in three months, and nearly all the rest were fit in six months. One was not fit after three months, [illegible] and one died after an operation for removal of foreign body. These figures include a certain number of cases with retention of an aseptic foreign body. Apparently the [illegible] results as perfect when the haemothorax is tapped as when it is not, but it takes longer: less than half, 9 out of 22, were fit in three months, whereas with [illegible] 15 out of 2[illegible] were fit in that time.

According to Elliott's figures in 20 cases, a small sterile haemothorax does [illegible] 14 were fit in three months and 6 in six to eight months. 11 of these had an effusion estimated at twenty to forty ounces, well up into the axilla.

Retained Foreign Bodies in the Lungs or Pleura. Such missiles are likely to carry in septic infection, especially in the case of fragments of shrapnel or high-explosive shell. Bullets or small fragments may, however, remain sterile, and in that case the prognosis does not appear to be much worse than with in-and-out wounds. Of 14 such cases followed up, 4 were fit for duty in three months, 7 in four to fifteen months, 2 were unfit in consequence of nerve lesions, and 1 was dead after an operation to remove the bullet.

In many cases retention of a foreign body is followed by infection, and a septic haemothorax or abscess of the lung develops. When the retained fragment is larger than a small hazelnut the danger becomes very great, especially if the wound in the chest wall is open for the pleural cavity to communicate with the outside air. The ideal treatment is early operation under a local anaesthetic, excision of the track, removal of the foreign body, cleansing of the pleural cavity and closure without drainage. Apart from successful removal by operation, very few patients with a large piece of shell retained in the lung ever get down to the base alive. When the fragment is small enough for the patient to reach the base in safety, only 21 per cent out of 86 patients developed a septic haemothorax or empyema.

Open Wounds. These wounds are very dangerous. Apart from operation [illegible] before they reach the casualty clearing station. When a large foreign body is retained the risks are greater still, death resulting within a few days from haemorrhage, shock, mechanical displacement of the thoracic viscera, or virulent sepsis, anaerobic or streptococcal.

[illegible] improved results have later been obtained by early operation under a local anæsthetic. A gauged tourniquet, the track by which removes the foreign body, and clean cut and close the pleural [illegible]. Captain Anderson succeeded in saving 41 out of 58 such cases of the fatalities suffering from multiple wounds. Twice he required a secondary operation for drainage. More recently Lockwood has operated on 50 only 6 died, and none needed [illegible]. To obtain access to the shell fragment it is usually [illegible] to resect a long piece of one of the ribs. I have used [illegible] anæsthesia in such cases with good results, but it is not a routine. There is some risk of pneumothorax in the [illegible]. One of my patients died on the table from hæmothorax, the shell fragment having been driven into a small branch of the [illegible] artery.

[illegible] Roberts and Craig saved 10 out of 29 open cases, and most of the failures death was due to other injuries. During the battle, 108 out of 255 chest cases operated upon at casualty stations died (42.3 per cent.).

The subsequent history of patients operated on thus early appears [illegible] satisfactory. I am privately informed that there were only 8 [illegible] at the base out of 183 chest cases operated upon at the casualty [illegible] station. Secondary drainage was required in 32, of whom [illegible]. Of 51 cases sent down with pleura closed, 2 died; of 35 [illegible] with pleura drained, 1 died.

Infected Cases. About 14 per cent. of the whole number of chest [illegible] at base hospitals show evidence of sepsis, a 29 per cent. of [illegible] with effusion, and of these 40 per cent. die. Of the survivors, [illegible] followed up, and it was found that the results were:—

Fit for duty in six months or less	18 cases
Fit for duty in over six months	11 "
Unfit	20 "
Not yet classified	15 "

[illegible] 60 per cent. of those who survive, therefore, make a perfect [illegible]. The outlook is by no means so good if a foreign body is [illegible]. Only 30 per cent. of these became fit for duty.

[illegible] and suffer from a persistent sinus or from chronic cough and [illegible].

[illegible] may briefly summarize as follows:—

Of all chest wounds up to the present, at least one-quarter have [illegible].

Small in-and-out wounds without effusion almost all recover.

The majority develop hæmothorax. Four-fifths of these remain [illegible] and are fit for duty in three months, and nearly all the rest [illegible] months. Except in large effusions, aspiration does not hasten [illegible].

A small non-infected foreign body, with hæmothorax, is not [illegible], and the patient recovers fitness, but not so quickly.

[illegible]

5. Cases of pus [illegible] and those with extensive [illegible] larger than a [illegible] need [illegible] unless there be [illegible] operation, [illegible] about 1.5% of them.

6. Of infected cases treated by rib resection and drainage, [illegible] half die. Of the survivors [illegible] recover in about six months [illegible] a fair [illegible] is retained.

R[illegible] October 7, 1917, p. 579.

WOUNDS OF JOINTS

[illegible] especially true in the case of the joint, that the prognosis depends on whether infection does or does not develop. If the wound [illegible] complete recovery will take place usually with [illegible] of the joint, often complete mobility if the joint surfaces are approximately intact. If there is infection, a stiff joint is unlikely, and there is some fear of prolonged suppuration, amputation, or even death.

Knee joint. We shall consider the case of the knee joint first, as the observation here is more the most important.

In spite of bullet or fragment in bullet wounds with a small exit and entry, recover always do well, and give a perfect or nearly perfect result without any operation being necessary. Shell wounds, or gun bullet wounds with a large exit, almost all require some operation, or cases is pretty certain to supervene. Even if the case does seem to do well for weeks, it is very disappointing to find that late suppurating cases, and I have seen on several occasions at an English hospital.

The special problem during the second of the battle of the Somme, dates to December 1916, in cases of knee joint injury, [illegible] was shown by the Rouen figures.

[illegible]	195	
[illegible] without	107	
Total	845	
[illegible]	164	19.4 per cent
[illegible]	72	8.5

[illegible] no doubt that [illegible] November, 1917, much better results [illegible] by the wide-spread application of a [illegible] technique, including excision of the wound, cleansing of the joint (the [illegible] 1000 brilliant green, and finds it very reliable), removal of large bodies, closure of the joint cavity by suture, and the use of a [illegible] antiseptic such as that used in the Carrel-Dakin treatment, B.I.P.P., or, best of all, 0.5 % [illegible] in brilliant green. Large pieces followed by efficient bracing of the knee. If the joint cavity can be closed, the great majority of the cases heal by first intention, even if the patient is split, if there is some not extensive damage to the [illegible] or tibia.

Of 522 such cases in the Rouen figures, only 82 required further

[illegible] that is to say, three-quarters did well. To-day the proportion in properly treated cases is undoubtedly still higher. Quite recently, in a French base hospital, obtained by this technique the following results:

Cases admitted [illegible]	47
Cases operable [illegible]	27
Limited movement	4
Stiff joint	14
Amputated	1
Died	1

The results are in reality better, because in some of these it was impossible to close the capsule. This particularly applies to the [illegible] cases.

When the bones entering into the joint are extensively smashed, excision may avert the necessity for amputation. In this [illegible] a stiff joint results.

Septic and easily infected wounds.—The prospect of a perfectly movable joint is much less. Rogers figures, 38·4 per cent of the 336 cases in this group underwent a further operation. The others presumably did well, but [illegible] that be likely to get a perfectly movable joint.

Infection occurs, the outlook becomes much graver. The wound that is likely to lead to infection can often be recognized at [illegible]. If the patient comes under treatment soon, than forty-[illegible] after injury with an open fork of the joint, if the capsule is closed, if there is much bony comminution, if a piece of [illegible] or cloth is retained, or if the vitality is reduced by gravity [illegible] of multiple wounds, the risk is much increased. Much [illegible] on efficient surgery at the casualty clearing station.

Ultimate Results of Septic Arthritis of Knee.

[illegible]	29	18		[illegible]	8
[illegible] and Wettenhall	20	7	10	1	2
[illegible]	21	12		4	5
Total	70	47		5	15

Rogers figures, when the cases that required no further interference after a conservative operation on the joint, and therefore [illegible] remained aseptic, are deducted from the total number, [illegible] a residue of 397, and there were in the whole series 72 deaths [illegible] amputations. Excepting a few multiple septic, all the [illegible] probably came into this group, so it is clear that not more

[illegible]

Hip-joint. Wounds of the hip-joint are not common. [illegible]

Ankle-joint. Wounds of the ankle-joint are difficult to [illegible]

shoulder joint. [illegible]

elbow joint. [illegible]

wrist joint. [illegible]

[illegible]

COMPOUND FRACTURE OF THE FEMUR

[illegible]

[illegible]

HEMATOCELE, PELVIC. [illegible]

HEMATOMA, ARTERIAL. [illegible]

[illegible]

[illegible]

[illegible]

[illegible] shown in [illegible] table [illegible]

[illegible]	41	[illegible]	[illegible]	[illegible]	12
[illegible]	17	[illegible]	10	[illegible]	12
[illegible]	1	100			
[illegible]	39	[illegible]	[illegible]	[illegible]	[illegible]

[illegible] **Carotid**, of which 6 died [illegible]

[illegible] **Brachial** [illegible] **Femoral** [illegible] 2 out of 56 showed this complication [illegible] In 9 cases the artery had been [illegible]

Popliteal [illegible]

Gunshot injuries [illegible]

[illegible] When the artery has to be tied [illegible] In Colonel Makins' series from base hospitals in France [illegible] 1 did well and 1 became hemiplegic. Two [illegible] Of 3 axillary cases 1 did well, another was [illegible] but lived, and the third died. The femoral was tied 10 times, all the patients doing well except 1 [illegible] already present. Of 4 cases of ligature of the [illegible] femoral 2 did well, 1 died, and 1, though already gangrenous.

HAEMOPHILIA. [illegible]

[illegible]

I. **Prognosis as regards Patient.** [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

2. **Transmission of the Disease.**—[illegible]

HEMORRHOID'S. [illegible]

Results of Operation. [illegible]

HEAD INJURIES.

Mortality of Head Injuries.

[illegible] Bellevue [illegible] Vanderbilt [illegible] Hospital, [illegible] Bellevue [illegible] Hospital.

Mortality of Hernia [illegible]

[illegible]	[illegible]	285	176	[illegible]
[illegible]	[illegible]	205	89	[illegible]
[illegible]	[illegible]	168	54	[illegible]
[illegible]	[illegible]	58	33	[illegible]
[illegible]	[illegible]	116	41	[illegible]
[illegible]	[illegible]	88	29	[illegible]
[illegible]	[illegible]	72	46	[illegible]
[illegible]	[illegible]	126	120	[illegible]
[illegible]	[illegible]	36	14	[illegible]
[illegible]	[illegible]	25	3	[illegible]
[illegible]	[illegible]	36	30	[illegible]
[illegible]	[illegible]	26	20	[illegible]

[illegible] fractured base [illegible] under 50 per cent. [illegible] one hundred [illegible]. Out of 157 [illegible] New York [illegible] 51 cases [illegible] that is, less [illegible]

Data for Prognosis. [illegible] prognosis [illegible] the patient [illegible] and even if consciousness has not been lost [illegible] that the [illegible] is [illegible]. The great majority [illegible] after a week [illegible] rise [illegible] consciousness. The degree, depth, or prolongation of [illegible] is of very small value [illegible] favorable, [illegible] if the patient is still unconscious [illegible] Phelps. Now with such [illegible] consciousness, if properly treated [illegible] consciousness, after a [illegible] is of [illegible] delaying [illegible] as in cases of [illegible] the patient will almost certainly die [illegible]

[illegible] Phelps. [illegible] from the first and [illegible] no tendency to rise, the patient [illegible] of shock. [illegible] at any time [illegible] possible. However, [illegible] Phelps [illegible] reached, and very few survived whose temperature rose [illegible].

[illegible]

[illegible] condition than in adults.

[illegible]

Septic complications [illegible] cause the death of the patient [illegible] if the meninges are [illegible] with an open wound [illegible] fractured skull [illegible]

Late deaths are due to sepsis in most instances. [illegible]

[illegible]

Eventual Results of Head Injuries. [illegible]

[illegible]

[illegible]

Localised Injuries of the Brain are the most important sequels of a head injury. It is well known that persistent headache or neuralgia, [illegible] loss of memory, mental enfeeblement, or traumatic epilepsy may follow such an injury, and may [illegible] the patient for the rest of his life. Sometimes he becomes very sensitive to the effects of a bad [illegible] easily upset by [illegible]

[illegible] at St. George's Hospital, and obtained the following results, with which the statistics of Rawling closely agree:

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	48	42	[illegible]

[illegible] 52 [illegible] of 80 [illegible] young men and women, [illegible] totally disabled and the rest partially. In the second series [illegible] 78 caused their own wages. Above labor standard and [illegible] easily. The old and the young suffered most.

[illegible] unfortunate end-results can be prevented by a [illegible] treatment at the time of the original injury. Patients [illegible] the hospital class are usually allowed to go home to work. [illegible] every case of head injury should be kept quiet in bed [illegible] until the dazed look of the face has passed off, the blood [illegible] has risen to normal and the patient [illegible] attempting to get up. [illegible] years, the patient should be kept a quiet life [illegible] months, [illegible] conditions being associated [illegible] permanent trouble. It is perhaps safe to decompress [illegible] of cerebral irritation lasting six or seven days.

[illegible]tic Epilepsy.—In most cases there is evidence of [illegible] sion, such as a depressed fracture [illegible] or tear of the cortex, but sometimes nothing can be found [illegible] of operation are not very successful; if a definite [illegible] removed the outlook is better. Much depends upon keeping [illegible] absolutely quiet for months after the operation. Reports [illegible] 20 cases of Jacksonian epilepsy, of which 2 were cured, 14 markedly [illegible] and 4 not improved. Causes gave results as follows: [illegible] attacks, 12; [illegible] 10; no improvement, 17; [illegible] status epilepticus, 2.

[illegible]ces. Phelps, *[illegible]*, [illegible] Rowlands, *[illegible] Skull and Brain*, [illegible] 1904. Anderson, [illegible] *Obst.* 1914, 522.

[illegible] Rowlands.

HEART-BLOCK.—(*See* [illegible] OBSERVATIONS ON THE.)

HEART, CHRONIC VALVULAR DISEASE OF. The outlook in valvular disease is notoriously obscure, and the [illegible] breaking in hardly warrants dogmatic statements. Recent [illegible] teaches us that it is a misconception to regard a lesion of the [illegible] as constituting a true mortal entity. The three great causes of valvular disease—rheumatic infection, syphilis, and atheroma—which [illegible] injure the valves, damage the [illegible] more important [illegible] at the same time. In a few years from now we shall speak of rheumatism or cardiac syphilis as the disease, and mitral [illegible] and aortic insufficiency as symptoms, or at most physiological diseases. A book on this [illegible] is, however, not the place [illegible] a sweeping change of terminology, and the more usual plan [illegible] valvular diseases along anatomical lines will be followed.

Mitral Regurgitation

[illegible]

Mitral Stenosis.

complication are found, the outlook is well-nigh hopeless; death is probable within the year (*see* ENDOCARDITIS, ULCERATIVE). The supervention of a fresh attack of rheumatic carditis is not so immediately dangerous. In the presence of polyarthritis, or chorea, or subcutaneous nodes, one should look out for pericarditis, dilatation of the heart, or fever persisting after subsidence of the outward and visible evidences of active rheumatic infection. These indicate fresh carditis, inevitable results of which are temporary impairment of the myocardium and permanent addition to the mitral fibrosis. For these two reasons rheumatic reinfection of the patient with mitral stenosis must always be regarded with respect; every such attack tends to shorten the patient's life.

One other accident may intervene to accelerate the patient's gradual progress to the grave—that of cerebral embolism. This occurs in a small number of cases: Bradshaw found that 6 out of 77 cases of mitral stenosis ended so. Apart from the symptoms that point to embolism of other organs, no warning is given of this calamity. It rarely occurs except in persons with marked evidence of circulatory embarrassment, save when it is due to malignant endocarditis engrafted on the fibrotic lesion. The presence or absence of symptoms of active infection will serve to distinguish between the embolism that arises from this cause, and that which is due to detachment of clot from the mass in the left auricle. In the latter case, if the end is to be fatal it comes at once; in the former, the immediate shock of the embolism may pass away, and yet death may follow after a short interval from the later effects of the infection of the interior of the skull which is implied in an embolism of this type. In either case the majority of cases of cerebral embolism complicating mitral stenosis do not end abruptly. The non-infective embolus that fails to kill establishes a hemiplegia which is never completely recovered from.

In a large majority of all cases of mitral stenosis death is due to gradual cardiac failure. The forces responsible for this are two. The heart, and especially the left auricle, is asked to do more work by reason of the valvular obstruction; and gradually increasing venous stasis undermines the nutrition of the cardiac, and particularly the auricular, musculature. An unconquerable vicious circle is thus established. The results are pulmonary engorgement, auricular breakdown, and ultimate ventricular failure. The first of these threatens death by predisposing to bronchitis, suffocative œdema, and multiple infarction of the lungs; and for these reasons dullness at the bases, signs of bronchial and alveolar catarrh, and haemoptysis are bad features of the case. Auricular failure can only kill in so far as it predisposes to the other fatal factors; that it lends itself to pulmonary hyperæmia is obvious, but it is not always realized how much the importance of auricular breakdown lies in its capacity for vexing the ventricles. The auricular contraction is not a vital function—the circulation can go on without it—for ventricular diastole will drain the auricles; but ventricular systole must go on, for if it stops, life stops

Now, auricular failure contributes to the ultimate downfall of ventricular function in two ways. The overworked, underfed [illegible] into fibrillation: instead of handing down a regular series [illegible] to the ventricle at the rate of, say, 80 to the minute, it pours stimuli into the ventricle in a disorderly and incessant stream, [illegible] into the latter chamber as fast as the auriculo-ventricular [illegible] will transmit them. The result is that the ventricle is [illegible] to contract more often than is necessary, and in so disorderly fashion that contractile substance cannot be built up on the rhythmic plan—a fact which cannot but indicate some way [illegible]

Left auricular asystole also adds directly to the work of the right ventricle, and thus increases the probability [illegible] It also helps to overthrow the ventricular functions by increasing [illegible] and so damaging the nutrition of the ventricular [illegible]

There are thus three things to take note of if we are seeking to [illegible] how near the patient is to auricular, and thence to ventricular [illegible] breakdown: (1) *Pitch of stasis*; (2) *Condition of auricles*; (3) *Condition of ventricles*.

1. *Pitch of Stasis* is to be measured by certain symptoms: dyspnœa [illegible] cyanosis afford our best means of measuring it in the earlier [illegible] later we may be guided also by the total daily output of [illegible] the presence or absence of hepatic enlargement, the size of the veins in the neck, and the occurrence of œdema (though this is quite a late feature of mitral stenosis).

2. *Condition of the Auricles* may be judged from data bearing on (*a*) their size, (*b*) their functional integrity.

a. Increase in the size of the auricles is a bad feature of mitral [illegible] as far as it goes, but it matters less than the more positive [illegible] evidences of impaired function. Dilatation of the right [illegible] is indicated by dullness filling in the cardio-hepatic angle; skiagraphy is also of service, and it is even more so in the examination [illegible] deep and inaccessible left auricle. The pressure signs that [illegible] from extreme dilatation of the left auricle (left recurrent [illegible] palsy, dysphagia, etc.) are all of serious prognostic import.

b. The signs of the previous class are less frequent and less ready to hand than the evidences of impaired auricular function. By far the most important of these is the totally irregular pulse, which is a constant feature of auricular fibrillation. The reasons why this upset of [illegible] bad for the heart's working have been stated above, but it [illegible] remembered that the inception of this form of arrhythmia [illegible] two things: the arrival of the auricle at an advanced stage [illegible] degeneration, and the addition of a new disability to the disabilities under which the ventricles are working. In 26 cases under [illegible] care the average age at which this form of arrhythmia [illegible] detected was about forty, a little in excess, that is to [illegible] the average age of death in these cases. This proves that the totally irregular pulse—or rather, the fibrillation which underlies

[illegible] in these cases of mitral stenosis that [illegible] the same [illegible] mode of termination. The patient may [illegible] if care is taken after this has developed [illegible] to go to work and lead a fairly active life [illegible] it will be on condition that he remains in the doctor's hands and [illegible] to be a invalid for the rest of his days. Total arrhythmia [illegible] a few months [illegible] to total incapacity. The expectation of life from the onset varies from a few months to ten years [illegible] in very fortunate cases. The average expectation being about five years. The factors making for long life in such chronic cases are a good constitution and a quiet life. For this reason only persons [illegible] in both of these conditions [illegible] in the latter the integrity of the heart [illegible] time to recover from the direct toxic [illegible] of the first two decades, and moreover the are less willing to go [illegible] for the rest of their days than are those who have [illegible] of dissection.

The other conditions of auricular failure are as a rule masked by this very stenosis, with which [illegible] to verify as they may be found if they are looked for, and they are not without importance, since the [illegible] the onset of fibrillation. Decrease in intensity of a previously [illegible] maximum, and lessening of the *a* wave as compared with the [illegible] in the jugular curve, both show that the auricular system is becoming less effective. With the onset of total arrhythmia, both maximum and *a* wave disappear entirely. In cases of mitral stenosis of long standing, with much dyspnoea and cyanosis, the appearance of many auricular extrasystoles in the pulse curve is often a forewarning of imminent fibrillation.

The Conditions of the Lungs. Vertiginous failure is likely to occur more in patients with dilatation of the ventricle, in those with large cardiac boundaries, in persons with high arterial tension and in those who are unaccompanied by mitral stenosis, and in those who are prescribed more gentle treatment as to the amount of rest.

The last passes into one of intense hyperpnoea of the lungs, with or without infarction. In this stasis, failure of the *right* as well as increased pressure in the lesser circulation is contributory. Two symptoms that may appear at this stage are worthy of separate mention, namely the cyanosis, orthopnoea and vertigo. The former is never fatal of itself, and its intensity differs in different cases. There is a constant slight way pain from the lung which does not betoken any serious pulmonary complication, it comes on early in the case, and is exceedingly intractable, but [illegible]. There is on the other hand a more acute and intense type of haemoptysis which is accompanied by congestion, enlargement and even by pain in the chest, points to the occurrence of infarction. This is evidence of a more serious [illegible] and death may follow soon. But people never have to [illegible] from the lungs in mitral stenosis, nor do they drown in their own [illegible] tuberculosis [illegible]. Vertigo may be [illegible] and intractable in this last stage of the disease; it may even kill the patient.

One final cause of death in mitral stenosis, rare indeed but yet worth bearing in mind, is cerebral haemorrhage. The reason lies in the association that sometimes exists between mitral stenosis and granular kidney, and the consequent occasional association between mitral stenosis and high tension. It is a rare coincidence, yet so important that the possibility of its occurrence should not be overlooked.

The risks of sudden death in mitral stenosis are small. The cerebral [illegible]m and haemorrhage, are possible causes, and the writer [illegible] least one death in early mitral stenosis which occurred without warning. Possibly this was due to recurrent acute carditis [illegible] no autopsy. At any rate, sudden death from cardiac [illegible] are in mitral stenosis that patients may be assured that [illegible] almost non-existent.

[illegible] *effect of treatment* on the prognosis, the most conspicuous [illegible] be derived is that which those enjoy who can and will con[illegible] their activities. With regard to the amount of activity that may be safely allowed, there is of course no fixed rule; but the [illegible] if he must, be allowed to undertake such work as does [illegible] to become breathless. The writer has under observa[illegible] present time five or six men with advanced mitral stenosis [illegible] as a gardener, another intermittently as a plasterer [illegible] a tanyard labourer, and so on. These men are better off [illegible] little money than starving in idleness.

[illegible] a little better than men, and if their circumstances are [illegible] and easy they do better than those who are compelled by [illegible] do heavy housework and to undertake personal respon[illegible] large families. Pregnancy makes the symptoms worse for [illegible] being, and introduces a small risk of reawakening of the [illegible] infection. French and Hicks found that in only 28 per cent [illegible] series of cases of mitral stenosis in married women was there [illegible] relation between pregnancy and heart failure; and in nearly [illegible] it took several pregnancies to bring on symptoms. It is [illegible] extreme cases that the patient has to be prematurely delivered [illegible] of the aggravating effect of pregnancy on the symptoms, [illegible] is rarely quite this extreme step its consequences are often [illegible] small, the patient being but little relieved; but on [illegible] the patient suffers no ill consequences from the strain [illegible] whether it be normal or reduced, providing it be not [illegible] or perhaps it would be more correct to say that [illegible] of that strain are more than counterbalanced by the relief [illegible] the emptying of the uterus and the removal of the impedi[illegible] which the full uterus offers. In French and Hicks [illegible] no single example of death during labour and in only [illegible] of those whose symptoms of heart failure began during [illegible] did the woman die within three months of delivery; and [illegible] of abortions was even smaller (5.5 per cent).

[illegible] regarding [illegible] in its effect on prognosis there [illegible] little to be said. The future hope in mitral stenosis lies in

[illegible] Once [illegible] is worth [illegible] [illegible] gained [illegible] from the use of digitalis [illegible] with [illegible] and total [illegible]. Armed with [illegible] and after a period of [illegible] patient [illegible] and [illegible] capacity [illegible] [illegible]. It has been [illegible] and digitalis [illegible] to [illegible] the pulse and [illegible] to dyspnœa and other symptoms in a case of mitral stenosis [illegible] auricular fibrillation. The patient is [illegible] case and cannot [illegible]. It is however [illegible] treatment [illegible] possible [illegible] to some [illegible] work; [illegible] already [illegible] [illegible] and hinting [illegible] [illegible].

Patients who are [illegible] [illegible] [illegible] to [illegible] [illegible] to give [illegible] [illegible] [illegible] as well as affording [illegible] [illegible]. [illegible] [illegible] of opinion is [illegible] the patient [illegible] [illegible].

The outlook in [illegible] is considered [illegible] by [illegible] effects on the [illegible] of the [illegible] apparatus especially the left [illegible] and the [illegible].

Aortic Regurgitation — [illegible] several [illegible] which may act together but [illegible] [illegible] [illegible] aries widely according to the [illegible]. This is [illegible] because different causes affect the mechanism in various degrees. Syphilitic lesions of predominantly and progressively atherosclerotic progressively, but less profoundly [illegible] rheumatism affect the myocardium severely but for the most part [illegible] transient [illegible] to repetition. The prognosis in any [illegible] exhibiting the signs and symptoms of aortic regurgitation depends also on the degree to which the valves are [illegible] and the extent of the secondary effects of these [illegible] on the general efficiency of the circulatory apparatus.

In the syphilitic cases the expectation of life from the onset of symptoms is about five years, if we exclude cases in which syphilitic infection of the aorta has led to the formation of an aneurysm, as well as to valvular disease. In cases of the latter type the prognosis is even worse.

In the rheumatic cases the prognosis is much better. This is not seen so well in mere statistics of duration of life after onset of symptoms and the like, as in a consideration of a few typical cases. Of a group of seven fatal cases seen by the writer in recent years, the youngest died at 14 in an acute attack of carditis, in which the aortic lesions had little [illegible] effect in bringing about the fatal issue; while the oldest was a man of 45, whose ventricular contractility had been failing for years. Of the rest, two died at 19 and 29 respectively, in what seemed to be an acute phase of rheumatic carditis; two other at 35 and 37 of ventricular failure, and the fifth at 29 of malignant endocarditis engrafted on the old valvular lesion. Thus the valve

[illegible] disease of the aortic valves are [illegible] and [illegible] the myocardium by a continuance of the acute infective process [illegible] and degenerative endocarditis. The mitral valves are much less often concerned than the other two valves, and fortunately enough to escape at least from the worst [illegible] the rheumatic infection is active and when one is able to avoid ventricular overdistension and back-forward failure of long life. For quite examples the writer has under his care [illegible] where rheumatic aortic disease [illegible] seven years ago [illegible] expectation for a lifetime and [illegible] at [illegible] can judge. The writer also knows two men [illegible] who live active and responsible lives [illegible] the aortic regurgitation bearing in each case for a number of years.

A third defined group consists of those cases in which the aortic [illegible] is one aspect of a cardiovascular process of the simple [illegible] type. When the syphilitic factor has been regarded this class is probably a small one, and no statistics are [illegible] Experience shows, however, that the course is lower than in the cases, but more rapid than the rheumatic ones that [illegible] into the fourth and fifth decades.

As to the clinical features of each individual case, we must find out how badly the valves leak, and secondly how well the heart [illegible] abnormal burden. As to the extent of valvular injury the physical signs are of less value than those which point to the effect of the leak on the peripheral circulation. The loudness of the aortic murmur and the extent of the area over which it is heard nothing as to the degree to which the valve is rendered incompetent except in this indirect way, that if the murmur be heard loudest over the aortic cartilage there is most likely some dilatation of the aorta and the prognosis is worse, since dilatation of the aorta in the cases that are syphilitic in origin or severe in character. The effect of the leak on the peripheral circulation is best measured by the pulse-pressure, i.e., the difference between the systolic and diastolic pressure. For the sake of accuracy it is well to use this with the sphygmomanometer in every case, but even this is not immediately feasible, a rough estimate of the circulatory [illegible] may be arrived at by noting the amount of visible [illegible] and especially the amount of visible capillary pulsation, the swing between maximal systolic and minimal diastolic in the peripheral vessels, the greater the amount of reflux and the [illegible] the prognosis. A similar conclusion is to be drawn from the [illegible] of those symptoms described as dizziness, [illegible] disturbances, etc., due to anæmia or disturbances in the supply to the systemic organs. The more marked these are the [illegible] the leak and the graver the prognosis.

More important than the state of the peripheral circulation, is the condition of the myocardium. How far is it able to

more difficult and very considerable task that is thrust upon us. Here a knowledge of the etiology is indispensable, and it is especially important to ascertain whether or not there is a syphilitic factor. A search for evidences of cerebrospinal syphilis, and an examination of the blood by the Wassermann method should not be forgotten here. The discovery of the syphilitic factor makes the prognosis worse, because it implies an attack on the myocardium a progressive and practically irremediable process. In the case be of rheumatic disease of the aortic valves, the most serious risk to which the myocardium is exposed is that of its invasion by the rheumatic process; this danger becomes less with advancing years, and after the age of thirty it is remote. Of the cardiosclerotic cases nothing need be said, but that the same morbid process that has led to calcification of the aortic valves is sure to interfere more or less with the nutrition of the cardiac wall, and to be so, though it develops yet progressively.

Not only etiology, but also symptomatology, come under review in finding out what chance the left ventricle has of coping with the extra burden thrown on it by the failure of the aortic valves. In this form of valvular disease the danger signals to be anticipated are those phenomena that point to exhaustion of ventricular contractility. There are three factors at work, the combined efforts of which are sure to undermine the efficiency of the ventricular contractions in the long run: the myocardial lesions of the causal disease, which have just been discussed; the persistent overstress to which the ventricle is exposed by the valvular leak; and interference with the myocardial nutrition by the disturbance in the peripheral blood-supply, which tells on this as on every other systemic tissue. Failure of contractility is therefore probable in all cases except those in which the first of these factors, the etiological one, has done its worst in early life and become inoperative later (i.e., in the rheumatic cases). It is for this reason that cardiac pain, dyspnœa, and œdema—all of them evidences of failing contractile force—are of more significance than any physical signs in aortic disease of long standing. For the same reason the alternating pulse is a very grave sign in such cases. Among the physical signs, those which point to progressive increase in the size of the ventricle, and loss of strength in the first sound at the apex, are of most significance. Anything suggestive of gross myocardial change (coronary thrombosis or embolism, rupture of the heart, formation of a cardiac aneurysm) is of course of almost immediately fatal import. Rupture of a valve, on the other hand, though it adds at once to the patient's discomforts and disabilities, does not by any means always kill at once. The writer has recently seen two cases, in the one of which the man was alive and at work till about seven years after the rupture seems to have occurred, while in the other a year had elapsed and the patient was still working. The opening which a sclerosed valve offers for the various organisms capable of setting up an infective endocarditis needs not to be enlarged upon; the supervention of septicæmic symptoms in a case of chronic disease of the aortic cusps will

[illegible] st the appropriate diagnosis and prognosis (*see* ENDO-ULCERATIVE). The possibility of other lethal lesions should [illegible] overlooked, especially in the syphilitic cases (aneurysm, cere[illegible] syphilis).

The liability to sudden death of persons carrying a leaking aortic valve is almost proverbial. Indeed, this risk has been rather over[illegible]d. Yet when we consider the double attack to which the [illegible] is exposed in this form of valvular disease—the direct injury [illegible] myocardium that is inflicted by that which causes the valvular lesion, and the less direct effects of overstrain resulting from the incompetence of the valve—it is not to be wondered at that this should be, above all others, that lesion which best and oftenest exemplifies the disastrous effects of exhausted ventricular contractility. In the syphilitic cases, if those which are terminated by rupture of an aneurysmal sac be excluded, death comes suddenly in nearly 40 per cent; in the rheumatic cases, the writer had only two out of ten fatalities that could by any means be called sudden. Syphilis is more likely to cause sudden death than rheumatism, because of its more enduring, and progressive interference with the nutrition of the myocardium. In many of the cases that end with unexpected abruptness, this [illegible] might have been foreseen and possibly averted if more weight had been given to the symptoms of failing contractility that [illegible]

[illegible] *the effect of treatment*, the results of antisyphilitic measures call for brief comment. No immediate and complete cures of aortic [illegible] disease can yet be placed to the credit of salvarsan; and as it is generally acknowledged that in the presence of cardiac disease the [illegible] this medicament is not entirely free from risk, it is best to rely [illegible]ry and iodide, the prolonged use of which (and especially the [illegible]) does indubitably ameliorate symptoms, as much, no doubt, [illegible]ion on the myocardium as by any effect on the valvular lesion. In the rheumatic cases the establishment of a quiet way of life [illegible] justified by its results.

[illegible]lete cure is excessively unlikely, but it does occasionally come [illegible]. Signs disappear, and symptoms also. Possibly in such cases [illegible] of the aortic ring has played an important part in rendering [illegible] incompetent, and its recovery of tone has restored its functional integrity to the valve. It is so unlikely and so unforeseeable [illegible] cannot be looked for with any confidence, but the fact that it [illegible]ar, if it be borne in mind, will serve to colour one's view of [illegible].

[illegible] it should be recollected that, despite its dangerous nature [illegible] variety of ways in which it may end life, the possession of an incompetent aortic valve is not incompatible with a long life. The [illegible] already given instances of this, and there are other remark[illegible] examples scattered through the literature [illegible] in which a man, known at 13 to have aortic valvular disease, was carry[illegible] with comparative comfort and freedom from symptoms at 66.

Aortic Stenosis presents three classes of cases to be considered. The first consists of those patients in whom the obstruction appears to develop slowly, the symptoms being first noticed at or about the age of 30, without obvious cause, apart from rheumatism in a few cases, and without accompanying signs of aortic regurgitation. This is a small group of cases, and the prognosis is nearly always bad—the patient rarely passes the age of 40. In a second group, the patient has already distinct evidences of aortic incompetence, when the signs of aortic obstruction become superadded. The result is a modification of the peripheral phenomena; the pulse loses its collapse and character, and so on. The effect on the prognosis in such cases is not as bad as one might assume at first sight, for the peripheral effects of the obstruction neutralize those of the regurgitation to some extent. Often the patient is actually more comfortable for the change. It is only in cases of severe valvular change that this sequence is encountered—so that the regurgitation is generally free and the symptoms are pronounced. The mitigation of the symptoms, which ensues upon the supervention of stenosis, affords the patient real relief, and delivers the ventricle from over-distention in diastole, thus diminishing the load which has to be lifted by each systole; so that, for the time at least, the heart's work is eased. Of course, the ultimate prognosis is not good, but it is not so bad as in the first group. In the third group are collected those cases of stenosis developing slowly in persons of 50 or over, thanks to a gradual calcification of the aortic cusps. Here the morbid process is a very slow one, and though the coronary arteries may be damaged at the same time, the myocardium yields but slowly and the patient may attain to old age.

In individual cases of aortic stenosis there are two things to be assessed—the degree of obstruction and the condition of the left ventricular myocardium. The former is determined by observation of the type of pulse rather than by the physical signs, though the prominence of the thrill and murmur must also be given some weight. The more characteristically flattened the pulse-wave, the worse for the patient. As for the state of the ventricular muscle, this is revealed by an examination of the functions; pain, dyspnœa, alternating pulse, and other evidences of failing contractility are ominous signs.

Treatment has little effect, even in the syphilitic cases.

Combined Aortic and Mitral Valvular Disease is encountered in two sets of cases. In the first the rheumatic inflammation which affected the one set of valves did the same by the other; in the second ventricular dilatation, consequent on aortic insufficiency and diastolic overfilling, has stretched the mitral ring, and made the valve incompetent. In the first class of case, the signs of mitral stenosis are added to indefinite evidences of aortic regurgitation; or it may be that the aortic lesion is pronounced and the mitral signs are vague; while in a few there are pronounced evidences of both. In any such case the gravity of the outlook is greater than in the presence of a single lesion, partly because the mechanical disabilities of the one lesion are added

of the other, and partly because the presence of severe and read endocardial lesions in post-rheumatic heart disease argues sence of diffuse and severe myocardial damage. In the second f cases the supervention of mitral incompetence in an aortic evidence of severe embarrassment of the left ventricle, and e of bad omen.

Acquired Lesions of the Tricuspid Valve. The prognosis in these is based on the fact that they never occur alone.

Incompetence is so common that some writers regard it as the normal functions of the tricuspid apparatus to open out tress and relieve a distended right ventricle by permitting amount of back-flow into the distensible liver and venous Whether this is going rather far or not, evidence does not ent allow us to decide; but there are certain facts available such diseases as mitral stenosis, cardiosclerosis, and chronic atis with emphysema, diseases which encourage hyperæmia and in the blood-channels that course through the lungs, lead at last stent over-stretching of the right auriculo-ventricular commun n and render its valvular apparatus permanently incompetent l, the clinical evidences of this persistent incompetence are those of venous stasis in the systemic circulation big veins in k, enlargement of the liver, diminution in the output of urine and so on. Third, the more pronounced and persistent these toms, the worse the outlook; partly because the condition of stasis thus perpetuated undermines the nutrition and efficiency ons vital tissues, the myocardium itself among them, but also the presence of extreme and permanent tricuspid failure proves stence of a proportionately severe hindrance to the drainage of esser circuit into the left heart. The presence or absence of a oid systolic murmur makes little or no difference to prognosis rate as compared with the significance of the symptoms mentioned. In the first place, it is not easy to decide whether or no there is tricuspid at all; in the second, the valve may be grossly stent without any murmur being audible.

uspid stenosis, if acquired, is always the outcome of rheumatic and as such is little more than an unusual feature in a common case. The tricuspid curtains are found thickened and stiffened all percentage of cases of mitral stenosis coming to autopsy, but ly in a very few of these that the presence of such a coincidence os can be diagnosed. When the diagnosis can be made, the t's prospects are a good deal worse than in an uncomplicated mitral stenosis. According to Newton Pitt's figures, the duration symptoms does not usually exceed five years, and about half ses fail to survive the age of 30. The liver pulsation, sufficient to yield a clear three-wave phlebogram, which has by some regarded as a sign of tricuspid obstruction, is sometimes encoun part from this condition; but even so, it is a valuable proof of ed engorgement of the right auricle, and as such is a bad sign.

Acquired Pulmonary Lesions. These are so rare that they [illegible] be specially discussed.

Pulmonary Stenosis is of course rarely diagnosed as an acquired lesion: it runs a short course, the length of which may best be gauged by observation of the state of the right ventricle. As in the corresponding congenital malformation, the patient is specially liable to contracted chest pathes.

Pulmonary Regurgitation, due to inflammation of the pulmonary valves, is a very rare lesion: the diagnosis is a bold one but if it be made it carries with it a bad prognosis. More common is the incompetence of the pulmonary valves which may develop in advanced mitral stenosis as a result of the great rise of pressure in the pulmonary artery. It is extremely hard in many supposed cases of this condition to be sure that we are not dealing with that very frequent result of rheumatic carditis, aortic and mitral valvular disease (endocarditis); but if this can be excluded and the diagnosis of secondary pulmonary insufficiency substantiated, it may be regarded as a bad sign in a case of mitral stenosis. It proves the existence of a high degree of circulatory obstruction; and it also threatens overloading of the right ventricle. As a matter of fact, its prognostic importance is not as great as might be expected, for it is only in cases of mitral stenosis that are obviously advanced, that one ventures on a diagnosis of secondary pulmonary regurgitation.

The general principles of prognosis may be briefly re-stated.

1. The valvular lesion is but a part of the picture: it is the observer's duty to discover as far as possible the state of the *whole* heart, and of all the organs.

2. The outlook depends ultimately on the balance struck between valvular disability and myocardial capacity. To what extent is the heart capable of rising to the occasion?

3. This question is best answered, speaking generally, by an intelligent exploration of the symptoms, and a search for evidences of myocardial extravagance.

4. It is particularly important to see what effect a period of rest has on the myocardial efficiency before giving an unqualified prognosis in an apparently bad case. *Carey F. Coombs.*

HEART, CONGENITAL MALFORMATIONS OF.—In forecasting the future of a child or young adult who has been found to suffer from a developmental fault of the heart, the questions that have to be answered are, *How long is he likely to live?* and *Is there any chance of a useful career for him?* It would be possible to answer these questions with considerably more precision and confidence if it were possible in every case to discover the actual nature of the malformation. Unfortunately, such detailed accuracy is out of reach in very many cases, so that one's prognosis is founded on a varying admixture of knowledge of the defect present and the average duration of life in

[illegible] with observation of the symptoms is made [illegible] the extent [illegible] the efficient working of the heart is threatened by the [illegible] imposed upon it by the errors in development.

Average Expectation of Life in Various Defects. The [illegible] figures are collected from the writings of Peacock, Maud[illegible]

[illegible] which is most readily, and therefore most often, diagnosed [illegible] pulmonary stenosis. Patients have been known to reach a good [illegible] this defect, even after an active life. The writer [illegible] a railway porter who at 23 was just beginning to [illegible] a cook who at 37 showed her first signs of broken compensation [illegible] lady of over 40 who leads a fairly active life. One case is [illegible] in which the patient reached the age of 52. These, however, [illegible] the exceptions. The average age at death in pulmonary [illegible] 9 and in pulmonary atresia 3.

[illegible] existence of other lesions is a matter of some weight. Of cases in which an autopsy has been made, 56 per cent of those in which [illegible] no associated defect of other parts of the heart ended fatally within the first two decades of life; of those in which pulmonary [illegible] was coincident with a defective auricular but a perfect ventricular [illegible] septum, the percentage was almost the same; of those in which [illegible] an associated defect of the ventricular but none of the [illegible] septum, only 9 per cent survived the age of 20; and of [illegible] whom there were faults in both septa, none passed that age. [illegible] of the foramen ovale, without other defect, is a common [illegible] important fault, but it is rarely diagnosed, so that we are thus [illegible] of the pleasure we might otherwise enjoy of giving a favourable [illegible] nosis in the great majority of these cases. Patients with this [illegible] lived a normal life without knowing that there was any [illegible] with them. The same is probably true of limited defects [illegible] septum ventriculorum; and since this is more readily detected it offers some small scope for the exercise of optimism, if one can be sure that no other defect of a more serious nature co-exists. Even when the septal faults are extreme and the heart is three-chambered [illegible] life may be reached.

[illegible] the other defects, congenital atresia of the tricuspid valve is [illegible] ently incompatible with survival beyond the first year of life. [illegible] one seventh of the cases in which a transposition of the great [illegible] trunks was found post mortem had passed the age of five. Patency of the ductus arteriosus, if uncomplicated by other deformi[illegible] compatible with the attainment of middle life and fair activity. [illegible] ation of the aorta may remain latent throughout a normal life, being discovered only at the autopsy. Of the cases verified post mortem, 14 per cent passed the age of 50. The gross defects of position, those in which the heart lies exposed owing to a thoracic defect [illegible] compatible with more than a few days of extra-uterine life. [illegible] one case is described in which life was apparently maintained [illegible] few days by the expedient of oiling the heart every three hours.

transposition of the heart; on the other hand, makes no difference [illegible] in the [illegible] and the heart [illegible] December [illegible] improvement [illegible].

Significance of Symptoms. [illegible] the patient [illegible] and [illegible] symptoms. The patient [illegible] and in some cases [illegible] heart disease [illegible] the [illegible] in the blood [illegible] and the [illegible] of the blood [illegible] and [illegible].

Of the [illegible] these unfortunate persons [illegible] tuberculosis and [illegible]. The [illegible] of the [illegible] and [illegible] acute inflammatory [illegible] of the [illegible] heart [illegible] it must be [illegible] that this is a very remote possibility. Consequently [illegible] congenital heart [illegible] who presents the symptoms and [illegible] with or without evidences of endocarditis [illegible]. The vulnerability to tuberculosis is greatest in those persons who [illegible] the first decade: when contracted it runs a rapid course. The [illegible] and the other pulmonary infections [illegible] if the patient's circumstances do not admit of his [illegible] protected and sheltered life.

Among the causes of death in cases of congenital heart disease, the possible [illegible] of [illegible] malformations in other organs must not be [illegible]. One of the writer's patients had pulmonary stenosis and [illegible] but death was apparently due to the [illegible] dilatation of the [illegible].

Sudden death is not a very common event in congenital heart disease [illegible]. It is impossible to lay down any [illegible] which [illegible] to the patient's usefulness, it is probably better to [illegible]. In patients with a patency of the interventricular septum and [illegible] of both ventricles by one arterial trunk, sudden attacks of dyspnœa and cyanosis [illegible] that avoidance of the provocative factor [illegible] will ward off further attacks.

[illegible] the prognosis in congenital cardiac defect is arrived at by [illegible] of the actual [illegible] possible, and by [illegible] assessment of the degree of cardiac embarrassment as revealed by the symptoms. *Cary F. Coombs.*

HEART, WOUNDS OF.—Lord Rosslyn at Dunkirk, in 1897, [illegible] classical and successful case of suture of a wound of the heart; the injury was regarded as mortal and treatment was [illegible] hours. To-day there are scores of successful cases on record. In [illegible] where the pericardium is [illegible] of [illegible] is not so common as on the Continent. The published [illegible] are few, and the wrecks only a [illegible] [illegible]. Some [illegible] caught the unnecessary majority of cases of wound of the heart [illegible] within a few minutes of not instantly, and therefore, [illegible] the most wounds. Even when this produced, loss of blood [illegible] death [illegible]. In the very [illegible], on which [illegible] written there [illegible] pistol-shot in a suicide to heart [illegible] through the [illegible] at autopsy; as this did not have the desired effect, [illegible] turned the weapon upon his temple and died of a [illegible] [illegible] the beam.

[illegible] cause of death in stab-wounds is not cardiac shock. The heart [illegible] animals and man will withstand extraordinary [illegible] usage. The [illegible] due to the mechanical obstruction of the diastole by effusion [illegible] into the pericardial sac. A heart which has almost or quite [illegible] beating has been restored by [illegible] of the blood in the [illegible] this should be borne in mind [illegible] dealing with patients [illegible] [illegible].

[illegible] to the records of operation, there are in the literature up to [illegible] about 230 cases treated by suture, [illegible] 140 died and 90 [illegible], a death-rate of 58·5 per cent. Probably the true death-rate [illegible] higher, some failures being likely to pass unreported.

[illegible] depends upon several factors.

It is essential, of course, that operations should be very prompt.

The mode of obtaining access is important. A flap with the [illegible] external is less likely to cause fatal double pneumothorax than [illegible] the hinge internal. The stab wound has usually opened one [illegible] already.

Wounds of the auricle appear to be less dangerous than wounds [illegible] ventricle. In Peck's series, the results were as follows:—

MORTALITY IN WOUNDS OF HEART.

Region	Cases	Died	Death-rate
Auricles	11	4	36
Left ventricle	74	45	61
Right ventricle	69	48	70

Death usually occurs on the table, or shortly afterwards; but some have developed aneurysm (nine on record) or leakage of the [illegible]; and suppuration has been responsible for some deaths [illegible] if the pericardial sac was drained.

REFERENCES.—Peck, *Ann. Surg.* 1909, [illegible], 101; Peck, *Ibid.* 1912, [illegible], 485.

A. Rendle Short.

HERNIA. Common as this disease is, it is extraordinary how difficult it is to find reliable reports in the literature as to the ultimate results of different methods of treatment, in an adequate number of cases. This is particularly true with reference to femoral and umbilical hernia, where a prolonged search of the surgical records of many countries has been almost barren of result.

The Spontaneous Cure of Hernia.—In young children, up to the age of four years, it is undoubtedly possible to cure some cases, probably only a minority, by the use of a truss. If this is to be efficient the hernia must never be allowed to come down, or all the benefit previously obtained is lost. What usually happens, no doubt, is that the sac becomes very narrow, and it may well be that heavy straining in adult life would reopen it. On this point we lack evidence. But it is quite certain that occasionally the neck of the sac may be obliterated. This has been verified by subsequent operation in one or two cases. In older children or adults, cure of hernia by means other than an operation is so rare as to be practically negligible.

Femoral hernia in infants is seldom cured by a truss.

The great majority of cases of umbilical hernia in infants disappear after a year or so, if a pad and bandage is worn. We do not know if they ever come back again in middle life.

The Danger of Strangulation.—It is very difficult to estimate the frequency with which a hernia becomes strangulated. Macready puts it at 1·6 per cent. The proportion of cases of strangulated to those of reducible inguinal hernia seen at a hospital is perhaps about 1 in 20; it is mere conjecture what proportion of the herniated members of the community who depend upon hospitals for surgery present themselves at those institutions for examination, but probably nowadays it is from a quarter to a half, which agrees pretty well with Macready's opinion. Femoral and umbilical hernias become, in proportion, much more frequently strangulated.

The risks of strangulation in persons who neglect treatment year after year, and neither have an operation nor wear a truss, must be much higher than 1·6 per cent, because this diminishing class furnishes the majority of the strangulation cases. It is a mere guess, but such a patient's prospects of calamity are probably 30 to 50 per cent in the long run, especially in the femoral and umbilical varieties.

The Results of Operation.—We shall have to consider: (1) *The operation mortality*; (2) *The prospects of cure or relapse.*

1. *The Operation Mortality.* This is, of course, very low nowadays. A few years back it was by no means inconsiderable; in four London hospitals in 1890 it was as high as 6 per cent. To-day, however, it is only from 0·25 to 0·5 per cent in adults, and a little higher in infants (Bull and Coley). Brenner, of Vienna (1906), quotes 2000 cases with 5 deaths (0·25 per cent). Pott's enormous figures, running into thousands, for the years 1895 to 1903, show: inguinal hernia, 0·7 per cent died; femoral hernia, 0·5 per cent died; ventral hernia, 1·1 per cent died.

[illegible]ties are due to sepsis, pneumonia, anæsthetic calamities, and [illegible]extraneous occurrences. Thus, the writer lost a patient who [illegible]ped typhoid fever; four or five instances are known in which [illegible]oral vessels have been injured, and some of these have been [illegible] deaths have resulted from wounding the bladder in the sac, [illegible]sence not having been recognized by the operator. The writer [illegible]o heard of unreported cases in which fatal intestinal obstruction [illegible]l, due in one instance to imprisonment of a loop of bowel by [illegible]rted sac in Kocher's operation, and in another to the intes[illegible]s [illegible] entangled in adhesions about a filigree.

[illegible] Prospects of Cure after Operation.

[illegible]al Hernia. The introduction of the Bassini method has [illegible] improved the results in adults. The older methods gave as [illegible] proportion of relapses as 30 to 40 per cent (Bull and Coley) [illegible] ligature of the sac, without slitting up the external oblique, [illegible] was followed by recurrence in nearly 30 per cent of the [illegible] Pott). In children, however, it is almost always successful, [illegible] had no failures in 52 cases.

CURES AFTER VARIOUS OPERATIONS FOR HERNIA.

[illegible] Bassini operation gives much better results. Pott's huge [illegible]n of German figures, published in 1903, shows about 10 per [illegible] recurrences, but other results are much more favourable [illegible]ns gives the statistics for 1905 for Massachusetts Hospital, [illegible]es being examined in 1909; in 113 cases followed, there were [illegible]cent of relapses. Dreesman, 1913, quotes only 2·7 per cent [illegible] 103 operations. Bull and Coley quote less than 1 per cent, [illegible] large number of their patients were children. The true figure, [illegible]es, is probably about 1 in 20. If relapse is going to occur, it [illegible]ly be in [illegible]e first year.

[illegible]er's operation gives equally good results, according to Pott's [illegible].

[illegible]moral Hernia.—According to Bull and Coley, there were no [illegible] in 125 cases of operation for femoral hernia, but this merely

[illegible] patients returned to them; they did not examine [illegible] from those allowed to be cured. Pott's figures are by no [illegible] posterior to surgery: of 158 cases operated on before 1903, with [illegible] closure [illegible] more than a third recurred; and when the [illegible] years sutured, nearly 30 per cent relapsed. At the Bristol Royal Infirmary, of 41 cases treated by various methods, 30 were well from eighteen months to four years afterwards, and 11 had relapsed, that [illegible]

Making use of the new method of closing the ring above Poupart's [illegible] C. A. Morton found 7 cases free from recurrence, and [illegible] had 2 failures after 18 operations.

Umbilical or Incisional Hernia. The results in these cases appear to be less satisfactory than in either of the others, and failures are often seen in English hospital practice after operations by the older methods. Of 86 cases followed through by Pott, 54·7 per cent were cured; but nearly half relapsed. Capelle's figures for 35 cases are [illegible] Probably the newer methods, the filigree operation and the transverse line of suturing, will show improvement on these results. At the Bristol Royal Infirmary, of 9 cases of umbilical hernia followed eighteen months to four years, 5 were cured and 4 relapsed.

REFERENCES. Pott, *Deut. Zeit. f. Chir.* 1903, lxx; Bull and Coley, *Jour. [illegible] M.* [illegible] 1907, [illegible] 1913; Kellogg, *Proc. Roy. Soc. Med.* [illegible] 1912, p. [illegible] 26; Symonds, *Boston Med. and Surg. Jour.* 1910, clxiii, 847; Capelle, *Beit. z. klin. Chir.* 1909, lxiii, 264; Lagge, *Proc. Roy. Soc. Med.* 1911, [illegible] 165.

A. Rendle Short.

HERNIA, STRANGULATED. If we use the term in its strict sense, excluding cases in which the herniated loop of bowel is merely obstructed by fæces, strangulated hernia, apart from treatment, is practically a death warrant. It would be impossible nowadays to obtain figures showing in how many patients the hernia would discharge its contents through the skin, and so save life at the expense of a fæcal fistula. In the great majority of cases in which this happens, death nevertheless supervenes, and until this release occurs the patient's condition is most pitiable, on account of burrowing abscesses and very violent and extensive dermatitis set up by the irritation of the contents of the small intestine. The percentage of spontaneous cures in cases of strangulated hernia is said to be about 2 per cent (Coley, in *Keen's Surgery*).

Gangrene of the Gut.—The occurrence of this complication depends upon three factors: the tightness of the constriction, the length of time that the hernia has been strangulated, and the situation. Of these, the first is the most important. In a series observed during five years at St. Thomas's Hospital, Corner found gangrene in 4 per cent of the inguinal, 10 per cent of the femoral, and 25 per cent of the umbilical cases of strangulated hernia. Usually it takes about three days to develop; there are, however, very many recorded instances in which gangrene has supervened in a day. Out of 119

f strangulated hernia at the Bristol Royal Infirmary, 2 had angrenous in less than twenty-four hours, and 1 in less than hours; there is a case in the literature which gangrened in rs. Of course, gangrene makes the prognosis as to life much

Duration of Life and Cause of Death.—Apart from operation, the duration of life, according to old figures supplied by Macready, seven to ten days. It may be much shorter; there are recorded instances of a fatal issue within twenty-four hours, and e been known to die within a couple of hours.

ause of death is usually peritonitis; next to this, profound ia. Others die of various lung complications, either from n of foul vomit, or from embolic pyæmia.

Treatment by Taxis. In the days of pre-antiseptic surgery, ed and vigorous taxis was employed in almost all cases. Of it frequently failed, and recovery by no means always took when it succeeded in reducing the hernia. Thus, accord- Frickhoffer (1861), of 300 cases of strangulated femoral hernia l by taxis, 14·9 per cent died, and of 518 cases of strangulated hernia, 7·8 per cent died. The deaths were due to reduction enous gut, rupture of the gut, *reduction en masse* (or reduction ther sac), pre-existing peritonitis, or paralysis of the bowel.

days, taxis is only employed with gentleness, and for a few minutes, in early cases; in late cases, it is usually possible to tell immediately by the feel that taxis would be hopeless.

young children, the writer has had considerable success in getting hernia strangulated less than twelve hours by tying the child l in an inverted position and giving chloral. This is often valu- as it allows an immediate operation to be converted into a erate one.

l only in early cases, for a short time, and with a light hand, is not likely to cause any damage, and if the bowel can be ned the patient will almost certainly get well. I have seen e bloody diarrhœa follow. Of 24 cases reduced by taxis at the l Royal Infirmary since 1900, every one recovered. If the nt is reasonably fit it is better to operate so as to cure the hernia.

Treatment by Operation.—One of the oldest of surgical operations, tomy for strangulated hernia has improved immensely in its s of late years.

tween 1836 and 1841, of 183 herniotomies in Paris, 62·2 per cent Between 1869 and 1888, of 283 herniotomies for strangulated nal hernia in four London hospitals, 59 per cent died.

the present time, the results may be gathered from the table on ext page.

will be observed that the mortality for inguinal and femoral is approximately the same, a little under 20 per cent; that al hernia is decidedly worse, and that in the majority of rator hernias the patients die.

RESULTS OF OPERATIONS FOR STRANGULATED HERNIA.

	IN	IN										
	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]						
St. Thomas's, 1907 to 1911	111	21	-	103	24		30	11		2	0	
Middlesex,[2] 1907 to 1911 -	37	8		29	1	-	11	2		3	3	
Bristol Royal Infirmary, 1900 to 1912	119	22		96	14		11	2		0		
Total	267	51	19	228	41	18	52	18	34	5	3	60

This agrees well with the experience of seven German writers quoted by Meyer[1]: out of 1429 cases of various hernias strangulated, 20·7 per cent. died; in 56 cases of obturator hernia, Meyer reports 32 deaths, that is, 57 per cent. At the present time I feel sure that the mortality of strangulated inguinal and femoral hernia is less than 20 per cent. because patients are sent up sooner.

We have next to consider the results of operation under certain special conditions.

The Age of the Patient.—All writers agree that the prognosis is much more grave in elderly persons. Children usually do well. According to Coins,[3] the mortality in 1902 was 23 per cent., but it is now 3 to 10 per cent. given early interference. Of 12 cases in infants under two years of age treated by operation at the Bristol Royal Infirmary every one recovered.

The Time of Operation.—It is no doubt true, in the main, that good results depend on early operation. Mc Cready[4] calculates from 129 cases:

Operation within 24 hours	-	12·5 per cent. died	
,, 24–48 ,,	-	26·4 ,, ,, ,,	
,, 48–72 ,,	-	36·3 ,, ,, ,,	
,, after 72 ,,	-	44 ,, ,, ,,	

It is a remarkable fact, however, in the figures of the Bristol Royal Infirmary, that the correspondence is by no means so close as might have been expected. After three or more days of strangulation 55 cases (25 inguinal, 30 femoral) were operated on: of these, 9 died, that is, 16 per cent., positively less than in those operated on early. It would be most calamitous, of course, to use this as an argument for delay. The truth is that cases with marked symptoms are likely to obtain help and get treated early, whereas there is a type of strangulation which comes on more quietly and is not so rapidly fatal.

The best results were obtained by operation within twenty-four

Of 88 such cases at the Bristol Royal Infirmary (femoral and [illegible] only 7 died, that is, 8 per cent, instead of the general average [illegible] 20 per cent. Of these 7 cases, some showed gangrenous gut, [illegible] were very aged.

Various Methods of dealing with Gangrenous Gut.—When [illegible] is gut is found at operation, two courses are open. We may [illegible] resect the loop, including any dilated paralyzed coils on its [illegible] or we may content ourselves with making an artificial [illegible] From a study of the literature and hospital records, Hesse [illegible] results as follows:

Artificial anus	604	431	71·3
Resection of loop	860	382	44·3

[illegible] not be concluded from these figures, however, that resection [illegible] bly the best treatment. No doubt the higher mortality is [illegible] to the fact that the very worst cases were treated by makin[illegible] [illegible]al anus. Like all literature figures, the results are probably [illegible] an unduly favourable light, owing to the publication of [illegible] and suppression of failures.

[illegible] 30 cases recently seen at St. Thomas's Hospital[illegible]:

18 were treated by resection:	8 cured,	10 died
10 ,, enterostomy:	1 cured,	9 died.
2 ,, invagination:	2 cured,	0 died.

Prognosis in Individual Cases.—*Before operation*, the principal [illegible] to an accurate prognosis are the age of the patient, the degree [illegible] and especially the frequency and nature of the vomit[illegible] [illegible] consists of foul jejunal contents, the outlook is grave; [illegible] definitely faecal in odour, the patient is usually doomed. [illegible] of peritonitis makes an almost hopeless prognosis; so does [illegible] of rupture with sudden cessation of the pain.

[illegible] *operation*, a Richter's hernia makes for a rather worse prognosis; [illegible] course, the presence of gangrene is very ominous. Meyer [illegible] 252 German cases in which gangrene was found: the death[illegible] [illegible] various statistics was from 50 to 85 per cent.

[illegible] *operation*, persistent vomiting is a grave sign; it may mean [illegible] of the gut. Sometimes washing out the stomach may give [illegible] if the vomiting is only due to jejunal contents therein. [illegible] extract, physostigmine, salines, or croton oil may overcome [illegible] dysis of the loop of bowel.

[illegible] already stated, strangulated umbilical hernia is worse than [illegible] or inguinal, partly because the patient is likely to be old, fat, [illegible] obtuse, and also because there is a tendency to consider it [illegible] obstructed, and so to delay treatment. Strangulated [illegible] hernia is dangerous because it is often diagnosed late.

[1]*St. Thomas's Hosp. Rep.*; [2]*Middlesex Hosp. Rep.*; [3]M[illegible] *Cent.* 1914, cliii, 497; [4]Collins, *Ann. Surg.* 1913, lvii, 188; *Treatise on Ruptures*; [5]Hesse, *Beit. z. klin. Chir.* 1907, iv, 1; *Lancet*, 1908, i, 1692.

A. Rendle Short.

HIGH TENSION, ARTERIAL. (See Arterial Tension, High.)

HIP, CONGENITAL DISLOCATION OF. Apart from surgical interference the outlook in this deformity is not favourable. Natural cure appears to be unknown, although there are a few records of improvement in patients with partial dislocation or subluxation. In addition, the lameness, shortening, and difficulty in walking increase rapidly during the years of growth, and even those children in whom the deformity is at first scarcely noticeable are eventually seriously crippled. In bilateral cases a good deal of spasm often develops, and the patient may become a chronic invalid.

We shall have to consider the results of two methods of treatment: (1) *The open operation*, and (2) *The "bloodless" reduction by Lorenz method.*

1. **The Open Operation.** This is seldom performed now. It was favoured by Burchard. There has been a considerable mortality, and it is apt to cripple the patient a good deal. Tuttle has performed it 40 times: 1 gave a good result, and 6 relapsed.

2. **The Lorenz Operation.** This operation is only suitable within certain limits, from three years old up to eight in bilateral and ten in unilateral cases. The risks are small. There is almost no mortality. 4 deaths in 1235 cases, according to Deutschlander, that is about 0.3 per cent. Occasionally the femur may be fractured. R. Jones mentions that he has seen this happen 4 times in 38 cases, and in the records of five Continental surgeons it appears 35 times in 856 cases (4 per cent). A transient paralysis sometimes follows the manipulation: 23 times in 755 French and German cases (3 per cent), but it soon clears up.

The results obtained are almost always an improvement on the previous condition, and often terminate in a more or less perfect cure, but usually there is some slight deviation from the normal, such as a tendency to abduction. Putting the femur in place undoubtedly makes it grow. Joachimstal used to reduce one leg at a time in bilateral cases, and found that the bone first replaced became longer than the fellow.

It is difficult to tabulate the success of the operation, because writers classify their results so differently. Lorenz, dealing with 572 cases, claims a cure in 63 per cent; his unilateral cases gave slightly better results. Hofta gives only 30 per cent of 250 unilateral cases as showing real anatomical restoration, and only 7 per cent in 65 bilateral cases. Out of 49 treated by Nutath, 18 gave an ideal result, 12 very good, 16 good, and 3 medium or bad. Stern quotes 2593 cases from the literature, with the following results: 4 per cent ideal anatomically and functionally; 7 per cent ideal functionally; 40 per cent good; 12 per cent poor.

All the figures given are previous to 1905; there has been some improvement in technique since that date.

We may conclude that in careful hands, accustomed to the method,

[illegible] give a thoroughly good, almost ideal, result, and that about [illegible] is a failure.

[illegible]ENCES. Tubby, *Deformities, including Diseases of Bones and Joints*. [illegible]stern, *New York Med. Rec.* 1906.

A. Rendle Short.

HIP, TUBERCULOUS.—(*See* ARTHRITIS, TUBERCULOUS.)

HODGKIN'S DISEASE.—(*See* LYMPHADENOMA.)

HYDATID DISEASE. Hydatid disease of the liver and other [illegible] in the upper abdomen will here be considered.

Prognosis apart from Treatment.—The condition may last [illegible] years without giving rise to trouble: Rolleston mentions [illegible] who had been tapped for hydatid twenty years before, and [illegible] the cyst had recurred. But a hydatid large enough to be [illegible]ed is always a source of danger to the host, the principal risks being rupture and suppuration.

[illegible]ure may be sudden, or a gradual leakage. Sudden rupture is [illegible] fatal. According to Cyr: from rupture into the peritoneal [illegible] 90 per cent die; into the pleural cavity, 80 per cent; bile-[illegible] 70 per cent; bronchi, 57 per cent; stomach, 40 per cent; intestines, 15 per cent; on the surface, 3 per cent. Occasionally the [illegible]y burst into the pericardium or inferior vena cava; these are [illegible] fatal accidents. If leakage takes place into the peritoneal [illegible] an immense number of hydatids may keep on growing in the [illegible]n and pelvis. The writer has seen a patient whose abdomen [illegible] be opened again and again for obstruction and pelvic pressure.

[illegible]ration produces a large abscess of the liver which, apart from treatment, is likely to be fatal.

Results of Treatment.—The principal methods of treatment are by aspiration and by enucleation of the cyst.

[illegible]ation has the advantage of simplicity, but not of safety. [illegible] through the puncture may follow and give rise to peritonitis or to dissemination, and there are cases on record where fatal haemor[illegible] has resulted. Although this treatment is often successful, the parasite is not always killed, and may grow again.

[illegible]leation is both more certain and less risky. It is well to inject the cavity of the hydatid with a little corrosive sublimate solution to kill the scolices and prevent dissemination if any fluid is spilled.

Both after aspiration and after enucleation, but especially the former, curious symptoms, called by the French 'intoxication hydatique,' may be met with. In the milder cases there is no more than an attack of urticaria. In severe cases, which are however very [illegible]re may be collapse, convulsions, dyspnœa, and death within [illegible]hours, without urticaria. Inasmuch as this result has been [illegible]th even when it is certain that very little of the fluid could have been spilled, it is probably a variety of anaphylaxis.

[illegible]RENCES.—Rolleston, *Diseases of the Liver, Gall-bladder, and Bile-ducts* 1912, 410; Devé, *Rev. de Chir.* 1911, 513.

A. Rendle Short.

HYDRONEPHROSIS.—Prognosis in regard to life in hydronephrosis depends on the following factors:—(1) *The nature of the obstruction*; (2) *The condition of the second kidney*; (3) *The presence of complications*; (4) *The success of operative measures*.

1. **The Nature of the Obstruction.**—Hydronephrosis may be due to malignant disease of the bladder or other pelvic organ. In some cases the dilatation of the kidney is moderate in degree, and there results the development of a large abdominal swelling. The obstruction is, however, bilateral, and on that account, as will be seen later, the prognosis is grave. The chief factor governing the prognosis is, however, the malignancy of the growth causing the obstruction. The growth in such cases is extensive, and from the point of view of radical cure is inoperable. The condition develops most frequently in malignant disease of the bladder, causing obstruction to the ureteral orifices. It is seldom that this stage is reached without sepsis being superadded, and pyonephrosis results. In malignant growths of the pelvic organs obstruction of the ureters takes place less frequently. It is surprising how the ureter may be surrounded by malignant growth and still remain pervious.

Congenital hydronephrosis is usually due to obstruction in the urethra, although occasionally no obstruction can be discovered. The resulting dilatation of the kidney is bilateral, and the prognosis is very grave, death taking place soon after birth in most cases. Occasionally congenital hydronephrosis is unilateral, but in these cases other congenital lesions are usually present, such as cleft palate, congenital atony of the colon, or other conditions, which contribute to a fatal result in early life.

2. **The Condition of the Second Kidney.**—This factor, which governs the prognosis in all diseases causing destruction of the kidney tissue, is especially important in hydronephrosis.

a. Bilateral Hydronephrosis.—Of the various diseases which may affect the second kidney when one kidney is hydronephrotic, hydronephrosis is the most common; about two-thirds of the cases are bilateral. In 665 collected cases, Newman found 217 unilateral and 448 bilateral.

Bilateral hydronephrosis is a progressive and fatal disease. When the obstruction remains unrelieved, death takes place after a period which varies greatly, but which always extends to several years. The cause of death is destruction of kidney tissue and resulting uræmia. The picture presented by the patient is one of gradual failure of the renal function. There is progressive emaciation, listlessness, headache, thirst, loss of appetite, and in the later stages, vomiting with complete anorexia, and recurring attacks of uræmia. The temperature, apart from intercurrent infection, is subnormal throughout. In some cases of bilateral hydronephrosis, few symptoms are observed until the very latest stages. A patient may have two hydronephrotic kidneys which form large abnormal tumours easily recognized by the eye, and appearing at different times or simultaneously, and yet present

tion of renal failure, and enjoy good, if not robust, health. However, the certainty that the balance of renal secretion be upset by a chill or other cause, and death takes place from uræmia; or that, if the recurring obstruction remains, slow progressive renal failure will eventually supervene. is in bilateral hydronephrosis depends also upon the cause. tal hydronephrosis, and hydronephrosis due to malignant in the pelvic organs, are, as already stated, beyond surgical are invariably fatal. Where the obstruction is remediable, ral obstruction, stone, obstructing bands, vessels, valves, the prognosis depends upon how far the destruction of es has been allowed to progress before operation; in other upon the ability of the medical attendant to make an early The results of operation will be referred to later.

Other Diseases of the Second Kidney.—In 8 collected cases of following operation upon a hydronephrotic kidney, the second was hydronephrotic in 2, atrophic in 2, the seat of nephritis in there was no second kidney in 2 cases. The prognosis in all ses, apart from any operation, is very grave, and the fatal issue be long delayed.

The Occurrence of Complications.

Infection.—The most common complication is infection of the nephrosis, and this has an important bearing on the form of n, and on the ultimate result of the disease. A hydronephrosis erous to life merely from the destruction of kidney tissue. If n is added, this destruction takes place more rapidly and tely, and further, the danger of absorption from a large pus- ing cavity is superadded.

ry considerable proportion of cases of hydronephrosis eventually infected. The entrance of bacteria may take place by way urethra and bladder after catheterization, but much more fre- the infection is hæmatogenous in origin. Whether infection place directly through the wall of the hydronephrosis from the and occasionally densely adherent bowel, is not certainly It appears likely that infection may take this route. It may mild character, so that the contents of the dilated kidney are and the deposit small in amount; such an infection does not er life from absorption, or militate against the success of plastic tions on the kidney. On the other hand, the infection may take e active form, and the dilated kidney contain a large quantity s, while there are a high swinging temperature and other signs of ia. The prognosis in such a case is much more grave, death place in unrelieved cases from toxic absorption, or from this med with uræmia. It is rarely possible to operate in such cases the object of preserving the remaining kidney substance, and the lies between a palliative nephrotomy and nephrectomy.

Rupture of Hydronephrosis.—This is by no means common, and ost invariably the result of injury, although this may occasionally

be of a traumatic character. In children rupture into the peritoneum easily may take place, causing fatal peritonitis; in the adult the rupture is extraperitoneal, and may cause death from suppression of urine. Recovery may, however, follow prompt operation.

c. *Tumor.* This is the last stage of hydronephrosis, when the second kidney is absent, or so far diseased as to be incapable of performing the renal function.

4. **The Success of Operative Measures.** The success or failure of operation for the removal of obstruction in the urethra, bladder, or renal pelvis depends upon the nature of the obstruction.

Nephrotomy has been performed in congenital bilateral hydronephrosis, without averting a fatal result. It may be used as a preliminary to plastic operation on the kidney.

Nephropexy, nephrolithotomy, the removal of bands and of aberrant renal vessels, and plastic operations on the renal pelvis, its outlet, and the ureter may be required.

The degree of success attending any of these operations depends upon the early diagnosis of hydronephrosis. It is now possible by means of pyelography to make a diagnosis before the kidney has reached such a size that enlargement can be detected on palpation of the abdomen. If this is done and the obstruction remedied, the kidney can be saved with little damage to its secreting substance.

In the later stage of hydronephrosis, when a palpable tumour can be detected in the abdomen, the kidney tissue is expanded and much destroyed. The removal of the obstruction does not restore the kidney to its normal state, and only saves what remains of the secreting substance. In the fully developed hydronephrosis, when the layer of kidney tissue is reduced to half an inch or less in thickness, the organ still retains a considerable degree of functional power. I have operated on both kidneys in a case of bilateral hydronephrosis, when each organ was reduced to a thin shell, and the patient is well and without renal symptoms four and a half years after the operation. There are cases of bilateral advanced hydronephrosis in which the patient has lived for many years, and there are other cases where a solitary kidney has been converted into a hydronephrotic sac, and yet carried on a renal function sufficient to maintain life.

Schlotter collected 86 plastic operations with the following results:

Section of valves	12	1	3
Ureteropyeloplasty	18	1	4
Ureteropyelonostomy	19	2	6
Lateral anastomosis ureters	13	2	3
Plastic operation in renal pelvis	1		1
Pyelophlebitis	4		
Orthopyelic resection	8	1	
Combined operations	11		
	68	7	17

[illegible]tomy, or incision and drainage of the sac, without re[illegible] [illegible]ecome the cause of the obstruction, is sometimes per[illegible] It is said to have resulted, in from 30 to 45 per cent of cas[illegible] [illegible]ament of the flow of urine through the ureter and healing [illegible]phrostomy wound; in the remaining cases a fistula per[illegible] [illegible] nephrectomy is only indicated when the sac is very large [illegible] wall so thin and fibrous that no renal tissue is present, and [illegible] be undertaken when it can be proved that a second kidney [illegible]t and efficient. Kummel performed nephrectomy on 35 [illegible] [illegible]ral hydronephrosis, with 1 death, and the late results of 5[illegible] [illegible]n were uniformly good. *J. W. Thomson* H[illegible]

IDIOCY.—(*See* Mental Diseases.)

IMPERFORATE ANUS.—(*See* Anus, Imperforate.)

INFANTILE CONVULSIONS.—Convulsive attacks, with symptoms [illegible]r less resembling those of epilepsy, may occur in infants of [illegible] ages. Here, as in all other diseases, the prognosis depends [illegible] the accuracy of diagnosis of the underlying cause.

[illegible] newly-born children, convulsions may occur immediately after [illegible] or within a few days. They are specially common after a pro[illegible]d and difficult labour, and first-born children are, therefore, [illegible]hable to such convulsions than later-born children. In these [illegible] convulsions, the convulsive movements, if limited to one side, [illegible]ongly suggestive of a cortical hæmorrhage, generally from rupture [illegible]ningeal veins. If such hæmorrhage be so severe as to produce [illegible]ural changes in the cerebral cortex, the unilateral convulsions [illegible]kely to be followed by permanent hemiplegia, more or less pro[illegible]d. Bilateral cortical hæmorrhages, from the same causation, [illegible]are bilateral symptoms of the same kind, and are amongst the [illegible]onest causes of bilateral hemiplegia (diplegia). As birth-hæmor[illegible] are generally situated on the vertex, the cortical centres which [illegible]tuated nearest to the middle line—i.e., the centres for the lower [illegible] are most severely affected; hence the resulting hemiplegia or [illegible] is usually most intense in the legs.

[illegible] newly-born children suffer from convulsions which are appar[illegible] the result of excessive venosity, or other morbid condition, of [illegible]blood, without actual cortical hæmorrhage. Such children are [illegible]sed, and may be severely convulsed, but the convulsions do not [illegible] the same constant commencement on the same side; they vary [illegible]r mode of onset, starting sometimes on one side, sometimes [illegible]other. In such cases, the prognosis as to the absence of subse[illegible]t paralysis is better than in persistently unilateral convulsions.

Many cases of generalized convulsions occur later in infancy, inde[illegible]nt of any evidence of difficult labour. Such [illegible] [illegible] [illegible] [illegible]only toxic in origin, e.g., during attacks of diarrhœa from dietetic [illegible]s. In these cases, if the gastro-intestinal irritation be treated

[illegible]

[illegible]

The cause of this convulsion is an infant may be accompanied by convulsions. These are generalized and bilateral, and do not tend to occur after the temperature has become normal. Even in the absence of fever, conditions of temporary cyanosis, as during a paroxysm of whooping-cough, may cause a generalized convulsive attack.

Convulsions of unilateral distribution, often associated with high temperature and delirium, indicate a localized cortical lesion of [illegible] most commonly due to the virus of acute polio-encephalitis. If the morbid process destroys a portion of the motor cortex, it is followed by a corresponding permanent hemiplegia or monoplegia of the face, arm, or leg, as the case may be, such weakness varying in intensity from a slight paresis to a profound hemiplegia. Moreover, in this variety of infantile hemiplegia, there is a subsequent tendency to recurrent convulsions on the hemiplegic side of the body.

In the convulsions of meningitis—tuberculous, meningococcal, etc.—the prognosis is that of the underlying disease. In cases of this sort, examination of the cerebrospinal fluid will give us valuable diagnostic and prognostic indications. (See MENINGITIS.)

Pierce Shaw.

INFANTILE DIARRHŒA. (See DIARRHŒA, INFANTILE.)

INFANTILE PARALYSIS.—Poliomyelitis anterior was formerly regarded as a disease *per se*, but recent observations have established the fact that it is but one variety of a widespread malady of infective origin, which attacks the central nervous system and its meninges, having a selective action upon the motor nerve cells. When the brain cortex is affected, we call the disease polio-encephalitis superior; when the motor nuclei in the bulb are attacked, we call it polio-encephalitis inferior; and when the anterior cornua of the spinal cord are affected, we term it poliomyelitis anterior.

Polio-encephalo-myelitis, therefore, is a febrile disease. It has an incubation period of six to eight days, and a febrile phase lasting about three or four. The muscular paralysis appears during the stage of pyrexia. If the cortical motor cells are affected (**polio-encephalitis**

[illegible] the child complains [illegible] of permanent cortical destruction. If the cells of the [illegible] are mainly attacked (**poliomyelitis anterior**), [illegible] flaccid paralysis of the trunk and limbs [illegible] is affected. The initial paralysis [illegible] spread than the [illegible] of muscular atrophy [illegible] at the nerve cell [illegible] of the [illegible] are merely affected by inflammatory [illegible] change [illegible] beyond an inflammatory [illegible] there is a possibility that the cells may still recover [illegible] the nerve cells are actually destroyed by the [illegible] process, as is generally the case, the corresponding [illegible] undergo permanent atrophy and paralysis.

[illegible] to see, from what we have said, that the prognosis of [illegible] differs according to the stage at which it comes under [illegible]

[illegible] the acute febrile stage, if there is no implication of the vital [illegible] centres, and the patient survives, the probabilities are [illegible] paralysis will, in time, clear up to a certain extent. It is [illegible] that if the cells have been merely œdematous, and not [illegible] destroyed, they may all recover, and the initial flaccid [illegible] or paresis of the limbs or trunk clear up completely. This, [illegible] is uncommon, and it is more usual to find that, whilst [illegible] muscles recover, other muscle groups remain feeble and undergo [illegible] indicating that destructive changes have occurred in the [illegible] cornual cells.

[illegible] the acute febrile stage has passed off, the question of the [illegible] of permanent recovery arises. This question is best answered [illegible] consideration of the electrical reactions of the affected muscles, [illegible] the faradic reactions. We wait until ten days, at least, [illegible] elapsed from the onset of the paralysis, in order to allow time [illegible] degenerative changes in the nerve cells and muscle fibres to [illegible] recognizable. After ten days or a fortnight, when some of the [illegible] have recovered voluntary power, whilst others are still flaccid [illegible] paralyzed, we proceed to examine these paralyzed muscles electri- [illegible] Those which still react to faradism will ultimately recover, [illegible] which faradic excitability is lost will probably remain perma- [illegible] paralyzed. Other muscles, again, show mere diminution in [illegible] response; these will recover to some extent. The recovery [illegible] muscles which are recoverable will be hastened by assiduous [illegible] massage and passive movements.

[illegible] patient is already in the chronic stage by the time he comes [illegible] observation, we have now to deal with the relics of an antecedent [illegible]. Presuming that all the surviving muscles have been brought [illegible] maximum development by a preliminary course of suitable [illegible] and electrical treatment lasting six months or longer, we

have to consider the prospects of preventing or diminishing deformities, and of enabling the patient to make some use of his paralysed limb. This is largely a matter for the ingenuity of the orthopædic expert. When the limb is flexed and flail like, the question of fixation of certain joints arises. This can sometimes be accomplished by arthrodesis, at other times by the application of a light splint, preferably made of celluloid. In other cases again, where the muscles on one aspect of a joint are paralyzed, whilst their antagonists are still active, transplantation of the insertions of muscles or tendons from the healthy to the paralyzed aspect of the joint, together with division or lengthening of shortened tendons, may serve to restore a certain measure of useful stability to a joint, and to correct deformities. Surgical measures, however, should not be thought of until the limb has had a persistent thorough course of massage and passive movements for several months at least. It is astonishing how often a limb, which at first seemed hopelessly paralyzed, recovers part of its motor power without the necessity for surgical interference. (*See also* TALIPES.)

Percy Stone.

INFERIOR VENA CAVA, WOUNDS OF. The inferior vena cava is occasionally ruptured by contusion of the abdomen, and this is a cause of very rapid death. The writer has seen one such case. The effusion of blood was very small, but apparently the heart failed because it received an inadequate quantity.

The inferior vena cava has several times been torn in removing a right kidney. Albarran considers that the best treatment is to ligature it. He collects from the literature records of 5 cures and 2 deaths following the procedure.

F. Rowlands Stone.

INFLUENZA. The prognosis in influenza depends primarily on the virulence of the organism, which varies greatly in different epidemics. Uncomplicated influenza is rarely dangerous to life. The mortality in the epidemic of 1889–1890 was in Munich 0·6 per cent., in Mecklenburg-Schwerin 1·2 per cent., in Leipzig 0·5 per cent., in the German army 0·1 per cent., in fifteen Swiss towns 0·1 per cent. These figures do not include cases of death from influenzal pneumonia, the mortality from this varies from 15 to 26 per cent.

The increase in the general mortality rate during an epidemic of influenza is chiefly due to increased mortality from acute diseases of the respiratory organs, and to a rise in the death rate of pulmonary tuberculosis. In the whole of Germany during the epidemic of 1889–1890 about 66,000 succumbed. Owing to the more malignant character of subsequent epidemics, deaths in England and Germany, the death rates were higher. Thus, deaths from influenza in London from January to March, 1890, were 738; from May to July, 1891, 2101; from January to March, 1892, 2078.

The influenzal bacilli may remain for a long time in the sputum in phthisical cases, especially in patients with pulmonary cavitation.

as they generally disappear after a few days in a typical acute course in a previously healthy person.

In some cases the initial symptoms are extremely severe and sudden in onset. For example, the disease may be ushered in with convulsions, coma, severe vertigo, or even acute mental symptoms, and yet the patient may be well in a few days. As a rule, after an uncomplicated attack, the patient passes through a rapid convalescence; but in other cases, when the course of the illness has been apparently in all its identical, convalescence is extremely long and tedious, owing to great debility, loss of energy both bodily and mental, insomnia, neuralgia, and gastric disturbance.

Patients are prone to relapse after a few days' interval, and not very infrequently. One relapse is much more serious than the original attack, as a pulmonary trouble, which was at first absent, may now arise.

With reference to the pulmonary form, in addition to the prognostic consideration to any form of pneumonia, a guarded prognosis should be given when the temperature has fallen to normal, as it is not unusual to have a second or even a third pneumonic attack succeeding one on the other. A particularly fatal form is that of hyperemia of the lungs, associated with dyspnœa and cyanosis, sometimes with sanguineous sputum, but without pneumonic consolidation. Such patients very often die after a few days with cardiac failure and tachycardia.

In some cases, resolution of the pneumonic lung may be delayed for weeks, sometimes even for months, after which the lung may become perfectly clear. It is well, therefore, not to be too premature in saying that the patient is suffering from an indurative pneumonia, if the lesion happens to be at the apex, that the patient is becoming tuberculous. On the other hand, an influenzal infection certainly most infrequently paves the way for a tuberculous lesion. Further, quiescent phthisis may become active, and healing foci break out afresh. Phthisical patients show a special predisposition to influenza, and influenzal patients to an increase of any tuberculous lesion present.

With reference to the prognosis of influenzal encephalitis, it is usual for the resulting paralysis to clear up entirely if the patient does not succumb to the severity of the attack. The prognosis is grave in cases, which generally occur in children, which assume all the characters of convulsions, including convulsions, headache, vomiting, coma, cervical rigidity, strabismus, mydriasis, inequality of pupils, grinding of teeth, tachycardia, and irregular respiration. According to some authors, the prognosis of influenzal epilepsy is decidedly better than in many other forms. The prognosis of uncomplicated influenzal psychosis is quite favourable, but it may last for weeks, or even months.

Influenza occasionally exerts its influence almost entirely on the heart, and when this occurs the outlook is very grave. There is a great tendency to syncope, the pulse is rapid, irregular, and feeble, there is pallor and precordial distress, and sometimes sweating. When

recovery takes place, convalescence is extremely tedious as a rule, and is accompanied with prolonged disturbance of the heart's action: this is generally rapid and irregular, though sometimes bradycardia with intermittent action persists.

An attack of influenza influences patients suffering from diabetes very unfavourably, and they not infrequently die in coma. It may also lead to abortion in a pregnant woman, and in this way render the prognosis exceedingly grave if pneumonia is also present. In some rare cases, repeated rigors occur throughout the course of the illness. These may arise without the formation of pus, pneumonia, or obvious visceral changes, and although the prognosis must be guarded, owing to the severity of the cases, too gloomy an outlook should not be given.

A. R. Cushny.

INSANITY. (*See* MENTAL DISEASES.)

INTESTINAL OBSTRUCTION. Under this heading we shall include cases of acute intestinal obstruction due to cancer, fæcal impaction, bands, apertures, Meckel's diverticulum, and volvulus. Intussusception, strangulated hernia, and chronic obstruction due to cancer of the colon or rectum are dealt with in other articles.

The most essential element in the prognosis is to make a careful distinction between fæcal impaction and organic obstruction. Many cases of simple impaction recover with ordinary treatment such as purgatives and enemata: when organic obstruction is present recovery apart from operation is next to impossible. In practice however, the distinction between the two may be extremely difficult, and most surgeons have seen a patient refuse a laparotomy, and recover nevertheless. Of course, if a mass of hard fæces can be felt in the rectum or colon, or if copious enemata immediately bring away a large evacuation, the diagnosis is clear. The difficult cases are constipated elderly people with a swollen or fat abdomen in which nothing can be felt, who have vomited once or twice, and are not relieved by enemata. It is much safer to explore the abdomen, if enemata fail and nothing can be felt in the rectum, without waiting to see if spontaneous recovery will take place.

It is probable that in a few rare instances the bowel has escaped by some lucky accident, from an organic strangulation; but almost invariably it is paralyzed soon after it becomes ensnared. Still these occurrences will lead a practitioner who values his reputation not to be too 'cock sure' in threatening death to a patient who refuses operation. The practical rule, however, is that if repeated enemata fail, and vomiting, abdominal pain and distention, and constipation are present, death within a few days is all but certain, apart from operation. One ought not to wait for fæcal vomiting—that is a death-bed phenomenon. Patients with *fecal* vomit may recover after operation. Those with vomiting of fæces very, very seldom. The most common cause of death is toxæmia, then peritonitis, and

[illegible]nally lung complications. Death on the table from inhaling [illegible]mit is by no means a negligible cause of fatality.

Results of Operation.—It is not easy to gauge accurately the [illegible]t-day mortality of intestinal obstruction treated by surgical [illegible] cases are operated on at all stages, for so many types of [illegible]ion, and in so many different ways. Some statistics, such as [illegible]man's, and Deaver and Ross's, are complicated by the inclu[illegible] a large number of strangulated hernia cases. They give the [illegible]ty as 45·7 and 42 per cent respectively. Both these series [illegible]blished in 1915. The most reliable figures available are the [illegible] for the years 1887 to 1907 from St. Thomas's Hospital, and [illegible]ublished by Gibson, though they are by no means recent [illegible]mbined study of the literature and hospital reports, Gibson [illegible]l in 1910 the results of 646 cases, whereof 312 died, that is, [illegible]nt. This includes patients with intussusception, but does [illegible]ude cancer. Treves (1899) and Moynihan (1906) both agree [illegible] actual mortality is probably 50 per cent, but Moynihan [illegible] that this is a reproach, and that "anything over 10 per cent [illegible]rtality of delay." In the St. Thomas's figures the death-rate [illegible]le cases was 56·7 per cent, and in malignant cases 65 per cent. [illegible] much the time of operation influences the death-rate is shown [illegible]son's figures, as given in the following table (the figures do not [illegible] intussusception, hernia, or cancer).

MORTALITY ACCORDING TO DAY OF OPERATION.

First	16	6	37
Second	44	17	38·5
Third	61	25	41
Fourth	70	27	38·5
Fifth	62	30	48
Sixth	44	29	66
Seventh	28	15	53·5
Later	107	59	55

The Varieties of Obstruction.—We must now take up each form [illegible]ruction separately.

[illegible] *impaction and foreign bodies* produce a form of obstruction [illegible] relatively favourable, and which will usually yield to simple [illegible]es such as enemata. Death from faecal impaction is very [illegible] unless the patient is utterly neglected. It is astonishing [illegible] they may survive without an action of the bowels; one [illegible] reported by Harris, was seen fifty-three days after the last [illegible]

[illegible] *[illegible]n by bands or kinks* is not favourable, because the small [illegible] is involved. The higher the block, the worse the outlook. [illegible] to Treves, the average length of life is about five days,

the extremes being eight hours and twenty days. In Gibson's 15 cases 31 per cent died. The treatment was usually division of the band—on 17 occasions resection was necessary—and an artificial anus was made in 22. Practically all these last died. Of 162 cases at St. Thomas's 35 recovered and 67 died. In Deaver and Rees's series, of 81 cases, 49 per cent died.

Volvulus, when not treated by operation, has an average duration of six days, the extremes being sixty-four hours and twenty days (Treves). Coppin and Sargent, reporting on 57 cases from St. Thomas's Hospital over many years, found 19 recoveries and 24 deaths. Gibson gives the death-rate as 41 per cent., when the bowel was untwisted 31 out of 79 died; when resected, 13 out of 16; when an artificial anus was made, the fatalities amounted to 19 out of 20.

Finsterer, using the published records of various German and Austrian surgeons, believes that resection gives better results than detorsion. In his whole series up to 1912, of 110 cases, 37 per cent died; resection and immediate end-to-end anastomosis had a mortality of the gut was not gangrenous of only 7 per cent in 29 cases. It is difficult to accept this as a fair representation, however. Most surgeons consider end-to-end anastomosis in the presence of acute obstruction very dangerous. Finsterer's cases probably include a disproportionate number of published successes.

Jankowski has reported 5 cases of volvulus of the coecum, of which 2 were cured and 3 died. Lenander reported 18 cases of volvulus of the pelvic colon operated on in Riga during ten years (1905–1915). The results are shown in the following table.

RESULTS OF OPERATION FOR VOLVULUS OF THE PELVIC COLON (JANKOWSKI)

Detorsion and fixation at incision	11	11	0
Enterotomy and exitus	4	3	1
Short circuiting operation to pelvis	6	1	5
Resection of loop	3	2	1
Gangrene already present	24	2	22

Gall-stone impaction, for some reason or other, is not as favourable as one would have thought. In Gibson's series of 40 cases, 57 per cent died; and in two long lists of 280 and 105 respectively, quoted by Treves in 1899, the mortality was about the same (see GALL-STONES). These statistics are all somewhat ancient.

Meckel's diverticulum caused obstruction in 12 of Gibson's cases, and 62 per cent died. Division or excision was practised 30 times, with 17 deaths; resection of bowel 5 times, with 4 deaths; and an artificial anus was made in 4 cases, with 3 deaths. At St. Thomas's Hospital 14 out of 22 died.

MORTALITY ACCORDING TO FORM OF OBSTRUCTION (GIBSON).

[illegible]	[illegible]	[illegible]
[illegible] bodies	16	25
[illegible]	186	41
[illegible]	121	54
[illegible]ne impaction	40	57
[illegible]'s diverticulum	42	62
[illegible] shared in opening or fossa	34	67

RESULTS OF OPERATION FOR INTESTINAL OBSTRUCTION AT ST. THOMAS'S HOSPITAL, 1887–1907.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]ception	202	109	93	46
[illegible]	29	10	19	65·5
[illegible] adhesions	60	24	36	60
[illegible] bands	42	11	31	74
[illegible]	5	0	5	100
[illegible]diverticulum	22	8	14	64
[illegible] stricture	9	1	8	89
[illegible] impaction	5	1	4	80
[illegible]	26	9	17	65
	400	173	227	56·7
[illegible] disease of bowel	137	48	89	65

[illegible]*ration in openings or retroperitoneal hernia* is also a serious [illegible]. In Gibson's series of 34 cases, 62 per cent died. During [illegible] last eight years, however, of 15 cases found in the literature, [illegible]re cured by operation, including one of my own.

[illegible]*cerous growth* is, unhappily, one of the commonest forms of [illegible] intestinal obstruction. At St. [illegible]homas's Hospital, out of 137 [illegible]ses, 65 per cent died. The growth in the great majority was [illegible]d in the pelvic colon or rectum. In Paul's series of 24 private [illegible] treated by colostomy, 9 were fatal. Of 23 cases at the Bristol [illegible] Infirmary all suffering from acute obstruction, and excluding [illegible]ts with a band, hernia, gall-stone, volvulus, or intussusception, [illegible]d: these were nearly all suffering from cancer of the bowel [illegible]d by colostomy. (For further progress of the cases, see COLON, [illegible]NOMA OF).

[illegible]he **Prognosis in Individual Cases.**—There is a remarkable *sex* [illegible]ence: the mortality in women is only 33 per cent, against 54 [illegible]nt in males (Gibson). This is difficult to explain.

[illegible] principal factors in judging the prognosis in any particular case [illegible]: *The time of operation;* (2) *The nature and frequency of the* [illegible]*g;* and (3) *The presence or absence of gangrene when the* [illegible]*n is opened.*

1. *The importance of early operation* has already been emphasised. The first two days are relatively favourable; after the fifth day the chances are assumed against survival.

2. *The nature and frequency of the vomiting* is very important. A high-up obstruction near the duodenum causes very frequent and urgent vomiting, without much distention of the abdomen, and the vomit becomes foul but not faecal. These cases are very fatal and operated on early. When the obstruction is low down in the colon or rectum, vomiting is late and infrequent, and there is more time before the patient passes beyond the reach of surgical help. If the vomit becomes foul, the outlook is grave; if faecal, it is almost hopeless.

3. *If a sanguineous area* is found at the operation, the chances of recovery are small, but not hopeless.

A "cheesy" percentage of one suffering from gaseous faecal is not likely to be saved, and the advent of peritonitis is practically a death warrant.

The method of giving the anæsthetic and of conducting the operation counts for something. If there is necessary vomiting or bronchitis, intraspinal or local anæsthesia is probably safer. It is very important to operate quickly, and to empty the distended, paralyzed coils of bowel by Moynihan's tube or some similar device. Physostigmine, salicylate, and pituitary extract will probably reduce the tympanites a little by averting post-operative intestinal paresis.

References: Gibson, *Ann. Surg.* 1900, xxxi, 486. Treves, *Intestinal Obstruction*, 1899. Moynihan, *Peritoneal Operations*, 1906. Lockyer, *Lancet*, 1912, 910. Paul, *Brit. Med. J.*, June 1912, i, 172. Jackson, *Deut. Zeit. f. Chir.*, 1913, Sept. Makins, *Bradshaw Lecture on Surgery of Obscure Abdominal Pain*, 1913. Beaver and Ross, *Lancet*, 1913, ii, 1485. McGuire, *Amer. Jour. Med. Sci.*, June 1917, lvi, 673.

J. Bland-Sutton.

INTESTINE, INJURIES OF. (See ABDOMINAL INJURIES.)

INTRACRANIAL COMPLICATIONS OF EAR DISEASE.—It is stated by Haseler that of 81,684 cases of suppurative otitis media 116 died of various intracranial complications (lateral sinus thrombosis 48, meningitis 40, abscess 28), a percentage of about 0·14. Sou. London figures agree with this. The risk, therefore, is about 1 in 700.

It is very difficult to find in the literature a sufficient number of reliable records by which we may judge the prognosis of these affections. Some statistics are altogether too favourable; in others a few successes have been reported and many failures overlooked. It must be remembered that, in practice, two intracranial complications often exist together, and obscure both the diagnosis and the prognosis.

Lateral Sinus Thrombosis.—Apart from operation, these patients nearly all die of pyæmia or meningitis, the duration of life varying from two to six weeks. Natural recovery does occasionally take place, but it is rare; the writer has seen one case. The prognosis depends upon early operation, but patients may occasionally be saved even after all signs have formed in the lungs.

[illegible]ding to Hunter Tod, about a third of the patients operated [illegible] Macewen's results were much better than this (20 out [illegible] At the Bristol Royal Infirmary, 5 patients out of 11 recovered [illegible] the fatal cases had an abscess as well. No doubt earlier [illegible] would improve the prospects very much.

[illegible] interviewed three patients some years afterwards. One was [illegible]ared; another suffered for months from pyæmia, and then [illegible] except for otorrhœa; the third complained of persistent [illegible] due to labyrinthitis.

Extradural Abscess.—All five of Macewen's cases recovered; but [illegible] many of these patients die, in spite of operation.

Abscess of the Cerebellum or Temporosphenoidal Lobe.—[illegible]mately the difficulties of diagnosis, especially of cerebellar [illegible] are very great. The classical signs, nystagmus, ataxia, or [illegible] very frequently absent; optic neuritis is inconstant; and [illegible]normal temperature is only present in about half the cases. [illegible] Bristol Royal Infirmary during ten years, 6 cases of cerebellar [illegible] were missed, but of 8 cases of temporosphenoidal abscess a [illegible]ful diagnosis was made in every instance.

[illegible]ARY IN CASES OF INTRACRANIAL COMPLICATIONS OF EAR DISEASE TREATED BY OPERATION

[illegible]	28	8	20	9	3	8	4	0	4
				37	20	17	10	9	1
[illegible]									
[illegible]	11	6	5	10	7	3	4	4	0
[illegible]									
							28	21	7
[illegible]							27	10	17

[illegible] experience, the main point in the prognosis is to operate [illegible] three days of the onset of drowsiness (not coma). Of 4 cases [illegible] 3 recovered; later than the third day none recovered. [illegible] prognosis after operation is very much better in temporo[illegible]al than in cerebellar abscess. Once again Macewen's results [illegible] better than those ordinarily obtained; but according to [illegible]stics of Henke and of the Bristol Royal Infirmary, from a [illegible] half of the patients may be saved in cerebral cases, and a [illegible] or less (7 out of 28 in Politzer's clinic) of the sufferers from [illegible]ar abscess. Of 100 patients treated at the London Hospital [illegible] ten years, 20 temporosphenoidal and 10 cerebellar cases [illegible] probably this is abnormally bad. Milligan's series of

27 operations for cerebellar abscess at Manchester during ten years is very gratifying, 17 being saved and 10 dying.

After operation the patient may remain in a drowsy state for days and yet recover if the pulse and temperature are normal. Bad symptoms often return and end fatally.

If the patient recovers, there is some fear of persistent liability to convulsions: the writer has seen one such case.

Meningitis. The onset of evidence of meningitis (head retraction, Kernig's sign, nerve palsies, irregular fever) is usually a death warrant, but a few cases have undoubtedly been saved. Macewen operated on 6 out of 12 cases where there was intracranial meningitis only, and saved them all; only 1 out of 6 patients with cerebrospinal meningitis recovered. The writer has seen a case saved by operation and drainage, combined with repeated lumbar puncture. Urotropine probably helps.

REFERENCES.—Macewen, *Pyogenic Diseases of Brain and Spinal Cord*; Neumann, *Cerebellar Abscess* (Lake's translation). Hunter Todd, "Intracranial Complications of Ear Disease," *Bingham's Systematic Operative Surgery*, iv, 429. Mulligan, *Brit. Med. Journ.* 1914, ii, 833.

A. *Rendle Short.*

INTUSSUSCEPTION. It will be necessary to consider, first, the acute intussusceptions, usually of children; and, secondly, the chronic intussusceptions of adults.

Acute Intussusception.—There is a *natural cure* of intussusception by sloughing of the intussusceptum. It is very difficult to arrive at any idea of its true frequency. Wiggins (quoted by Childe) puts the spontaneous cures at approximately 1 per cent; but there is always the probability that such a curiosity would turn up with undue frequency in the medical literature. The main point is that it is an event of excessive rarity in infancy; only 8 per cent of the recorded cases were in children under eight years of age. In adults it is not so very infrequent, and the slough may come away several weeks afterwards. A few cases die (said to be 3 per cent) even after passage of the slough. Apart from this very exceptional occurrence, the average length of life, in infants, is about three days. Cases have died within nine hours. Three or four reports in the literature appear to suggest that an intussusception may in very rare cases reduce itself spontaneously. I have seen one in a young man, verified by operation, which seemed very convincing. Several inches of the ascending colon remained swollen, red, and œdematous. The symptoms were characteristic, and lasted about twelve hours.

Cure by Injection of Water is now attempted by very few surgeons, because it often fails even in early cases, and it is impossible to tell for many hours whether it has succeeded or not, so that the necessary operation may be dangerously delayed. Clubbe, of Sydney, tried it in 138 cases, but it was only successful in 14 of these (10 per cent).

In Copenhagen, it is apparently the routine to treat cases of intussusception by injection of water under an anæsthetic, even two or

days after the onset. Koch and Oerum have furnished details of 97 cases, 60 per cent under twelve months old, treated between and 1909. One to two pints are injected with an enema syringe en taxis is used. Deep anæsthesia is required. In 2 cases the was ruptured. In the worst cases only, a primary operation is ed. If the injection fails, a secondary operation is undertaken.

LES OF TREATMENT IN COPENHAGEN BY INJECTION UNDER CHLOROFORM

2 months	187	87	13	39	100	87
2 months	114	65	24	16	89	25
AL -	301	152	37	55	189	112
					63%	37

rth as they are in the authors' tables, the results of injection course appear to be much better than those of operation. We have ated the figures according to the data furnished, so as to be o compare the consequences with those of the English school of

will be observed, first, that about half the cases are capable of injection and taxis under an anæsthetic, but secondly, that ntual results are not so good as the figures furnished by St. mew's Hospital or by Clubbe. When it is remembered that ction method was only used for the more favourable type of ls, and that in 65 graver cases primary operation was performed r that the Danish figures do not establish a powerful argument bloodless measures. It must further be borne in mind that perhaps a few recoveries were not cases of intussusception at all. If it is to administer an anæsthetic, it is usually also possible to

eduction of the Intussusception by Operation is the routine atment. Judging by the published statistics, about two-thirds of cases recover and one-third die. Records are given in the table

BLE OF CASES OF ACUTE INTUSSUSCEPTION TREATED BY LAPAROTOMY AND REDUCTION.

St. Bartholomew's Hospital*	59	46	78%	13	22
	116	83	73%	33	29
Bristol Royal Infirmary* -	46	28	61%	18	39
Thomas's Hospital* -	202	109	54%	93	46

of 59 children treated by reduction at St. Bartholomew's Hospital from 1901 to 1914, 124 cases operated on by Clubbe, and 46 cases of all ages, mainly treated at the Bristol Royal Infirmary from 1907 to 1912. The St. Thomas's Hospital figures are less favourable, but they go back to 1887.

The success of treatment depends principally upon early diagnosis. Clubbe quotes 123 Glasgow cases, of which,

Operation within	6 hours gave	60 per cent cured
"	6 to 12 hours gave	73.3
"	12 to 24	57.5
	24 to 48	26.6

Acute cases operated on after forty-eight hours nearly all die. But there is a more chronic type, in which the results are far more favourable. Thus 8 out of 12 such at St. Bartholomew's recovered. The higher death rate within the first six hours than in the next six hours points to a common phenomenon in the records of abdominal surgery. It need not be used as a plea for delay, as it means no more than that the difficult cases are sooner diagnosed.

Prognosis in older patients is worse than in infants—thus in the St. Bartholomew's Hospital series of the patients over two years 9 out of 19 died, and of those under two only 24 out of 68.

Treatment by Resection is a last resort method, and usually leads to a fatal result. There are a few instances of successes on record. At the discussion in 1910 at the Royal Society of Medicine 4 cures were mentioned: 2, aged two and four respectively, at the Queen's Hospital for Children, and 1 aged seven months, at Great Ormond Street, under spinal analgesia. Clubbe reports a recovery in a child of eleven months. 7 other resected cases all died. I have had one successful case in a boy of six, and have seen a recovery in a young man in whom five feet of gut were resected by Hey Groves. Four out of 24 resection cases, all patients over a year old, recovered in the Copenhagen series.

Relapse is uncommon. The only case which has come under the writer's notice is one in which an appendicostomy was performed partly for feeding purposes, and partly to prevent relapse!

Prognosis in Individual Cases depends largely upon the length of time before treatment is instituted: over twenty-four hours turns the chances against the child. Much vomiting, listlessness and lack of interest, and a depressed fontanelle are all grave signs. There does not appear to be much evidence that one anatomical variety of acute intussusception is more dangerous than another.

Chronic Intussusception.—This rare disease is usually of grave import, because it is likely to be diagnosed late, and reduction will probably be impossible. Of 6 cases treated by resection at St. Bartholomew's Hospital (1873–1908), 1 recovered and 5 died.

Maxwell, of Formosa, reports 6 cases there, whereof 3, treated by lateral anastomosis, recovered, and 3 died. The writer has seen one

[illegible] was rejected [illegible]. It would, therefore, appear to be [illegible] to leave the intussusception and do a short circumting lateral [illegible]

[illegible] *Ann. Surg.* [illegible] 1910, [illegible] *Lancet*, [illegible] *Ann. Surg.* [illegible] [illegible] *Med. Rec.* [illegible] *Med. Rec.* [illegible] *Med. Rec.* [illegible] *Ann. Surg.* [illegible] *Brit. Med. Jour.* [illegible] *Ann. Surg.* [illegible]

[illegible] *Brit. Med. Jour.* [illegible] *Ann. Surg.* [illegible]

[illegible] *Brit. Med. Jour.* [illegible]

ISCHÆMIC CONTRACTURE.—See MUSCULAR ATROPHIES.

JAWS, TUMOURS OF. Although there is no reason to believe [illegible] any difference between the prognosis of growths of the [illegible] the lower jaws, we shall follow the example of most [illegible] and discuss them separately, at least as far as malignant [illegible] concerned.

Epulis.—There is some difference of opinion as to what is meant [illegible] epulis. Under this name the older writers described [illegible] tend to be fibroma. According to Eve, out of 17 cases [illegible] at the London Hospital, 2 were fibrosarcoma, 8 were [illegible] 7 were granular or tissue. He doubts, therefore, whether [illegible] such thing as a fibrous epulis. In Kolmer's series of [illegible] stated there were 2 fibromas, of the remainder, 20 proved [illegible] 7 sarcoma, and 1 granulation tissue. Both these [illegible] to surgical clinics; in the reports of dental clinics [illegible] smaller and more chronic growths are likely to be seen [illegible] epulis is much commoner.

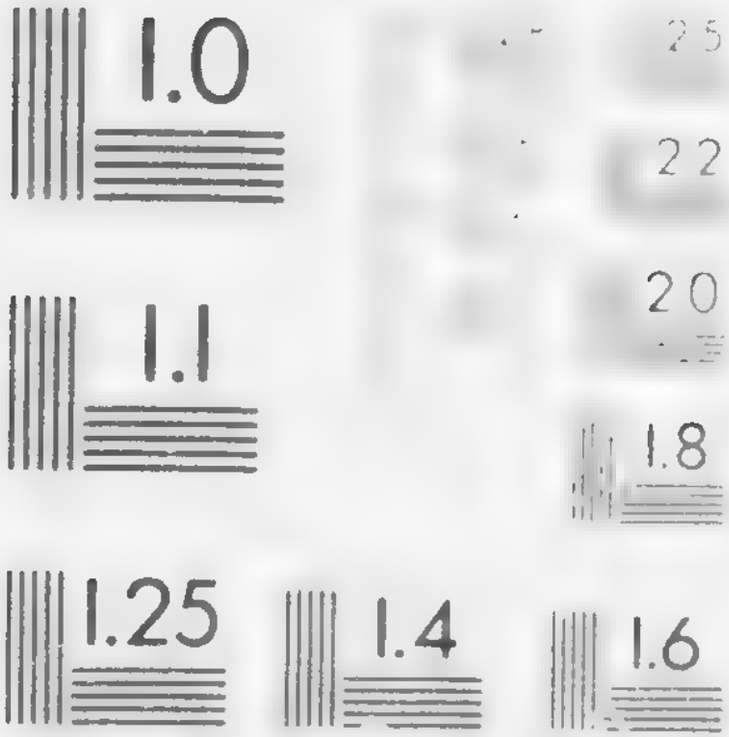
[illegible] we take epulis to mean a tumour of the gum, the majority [illegible] and be myeloid or fibrosarcoma. Nevertheless, the end [illegible] to be very satisfactory if an efficient operation is done [illegible] that is, if a small margin of healthy bone is removed [illegible] with the growth. It is not usually necessary to divide the [illegible] to encroach on the antrum, but even if this has to be [illegible] in a case of the writer's, it is remarkable how the antrum [illegible] time, so that a small addition to a dental plate closes it [illegible] The operation has almost no mortality.

EXTRACTS OF OPERATION FOR EPULIS.

[illegible] London Hospital	30	0	6
[illegible] Tübingen clinic	29	0	7

[illegible] 7 recurrences at the Tübingen clinic, 5 were cured by a [illegible] operation; in 2 patients death followed recurrence. The [illegible] findings in 30 of the cases are quoted above. We have [illegible] therefore, that even a so-called malignant epulis can usually

MICROCOPY RESOLUTION TEST CHART



be cured by a small operation—namely, removal of the portion of the alveolar process containing it.

Tumours of the Upper Jaw.—Coming now to the consideration of tumours involving the body of the jaw, or growing from the gums, we find a very much graver state of affairs. There are a number of published records on which to base an opinion as to the prognosis, mostly German and derived from a study of the end results in various museums and clinics.

These growths are nearly all cancer or sarcoma, and apart from operation are as a rule fatal in from one to three years. The only treatment is by partial or complete removal of the maxilla. Glandular involvement appears to be late and infrequent, so that it is not usually necessary to clear the lymphatic areas in the neck.

The mortality of removal of the superior maxilla is undoubtedly high. The figures for three London hospitals from 1886 to 1897 give a death-rate of only 12.6 per cent in 127 cases, but this probably includes a good many partial operations. The carefully described records of Eve, Butlin, and the Göttingen clinic under Koenig, running up to 1897, are more worthy of confidence, and these show a mortality of 16.6, 28.5, and 32 per cent respectively. Eve's figures are more recent (1907), and he practises a preliminary laryngotomy. Kronlein's estimate from the literature since 1875 is probably the most reliable figure we have for present-day surgery, and we therefore conclude that the mortality is about one in four or five. A partial resection is of course less dangerous. The fatalities are usually from pulmonary complications.

OPERATION-MORTALITY AND END-RESULTS OF REMOVAL OF SUPERIOR MAXILLA FOR MALIGNANT GROWTHS.

Eve	12	16.6			
Butlin	14	28.5	10	5	5
Kronlein (literature)	158	21.5			
Three London hospitals	127	12.6			
Goettingen clinic			17	0	17
Lathamer's clinic			12	2	10
Gottingen clinic	72	32	49	16	33
Bering clinic			47	5	42
Von Bergmann's clinic			21	6	15
Lilienthal's group			17	1	16
Total			173	35	138

Turning now to the *prognosis of cure*, we find here also plenty of room for improvement. Butlin records 10 cases of which 5 recurred.

[illegible] alive and well less than three years, and 3 were alive and well than three years afterwards—but in one of these the diagnosis [illegible] doubtful; two patients with epithelioma appeared to be cured [illegible] the orbital plate was left. In the Greifswald clinic the cases [illegible] 17, at the Erlangen clinic 1 out of 16, and in Estlander's clinic [illegible] 12, were successful. At von Bergmann's clinic 13 cases of [illegible] were operated on without success; but of 8 cases of [illegible] 6 were apparently cured. In the Berlin clinic only 5 out of [illegible] were cured by a total resection; but when partial removal could [illegible] used, half the patients were cured. The most detailed figures [illegible] albeit rather old now, are from the Göttingen clinic up to [illegible] there, of cases recovering from the operation, 16 out of 49 [illegible] apparently cured; of these, 14 were followed over three years [illegible] eighteen years in one instance), and 2 less than three years. [illegible] microscopical report on these 16 growths showed 8 epithelioma [illegible] cloid, 3 sarcoma, and 1 endothelioma. In the cancerous cases [illegible] orbital plate was always removed, because it was found that [illegible] recurrence followed if this was not done. In non-cancerous cases [illegible] plate was sometimes left; of 13 such, 1 died of the operation [illegible] cured, and 5 were apparently cured (2 under, 3 over, three years).

[illegible] may conclude, therefore, that in cases of malignant disease [illegible] for removal of the upper jaw, about 1 in 5 is likely to be cured [illegible] cancer cases are more serious than those with sarcoma or myeloid [illegible] great majority, recurrence takes place within four months [illegible] death in a year.

[illegible] serious deformity is, of course, left by the operation, and an [illegible] jaw will be required. Also, if the orbital plate is removed [illegible] may drop and cause diplopia.

[illegible] summarize, we may estimate that of 100 patients with growths [illegible] upper jaw treated by operation, about 22 will die of the surgical [illegible] and about 16 will obtain lasting cure—rather more in the [illegible] group and rather less in the cancerous.

Tumours of the Lower Jaw.—The material for judging the [illegible] in this variety of malignant disease is old and inadequate [illegible] has collected the records of 60 cases of excision of the lower [illegible] with 8 fatalities. The growths which call for the operation are [illegible] sarcoma, myeloid sarcoma, and epithelial odontome. Of [illegible] of periosteal sarcoma collected from the literature by Butlin [illegible] well nearly three years after, 1 died of pneumonia within a year [illegible] recurred. Of 43 cases of myeloid, 8 died of the operation, 2 [illegible] 30 were not followed up, and 13 were 'cured'—but only [illegible] were followed three years. I have seen a boy with periosteal [illegible] treated by excision of half the jaw, well after four years. Of [illegible] of myeloid of my own, one was cured by excision of a [illegible] of jaw and a very satisfactory prosthesis was fitted; another [illegible] after scooping out, but was cured by excision. Both have [illegible] followed over three years.

[illegible] the case of the upper jaw, grave deformity follows the

[illegible]

[illegible]

JOINTS, GUNSHOT WOUNDS OF. (*See* GUNSHOT WOUNDS [illegible])

JOINTS, INJURIES OF (*see also* KNEE-JOINT, INJURIES OF; HIP, CONGENITAL DISLOCATION OF; [illegible])

I. **Sprains.** [illegible]

[illegible]

A second difficulty in the way of a confident prognosis is the possibility of the development of some formed *arthritis*. Rarely, however, does this occur. Often the injury. More often and especially in the shoulder, a chronic arthritis may make itself evident, in which, after the acute stage, there is marked tenderness over the outlines and limitation of movement in all directions. It is very important not to attempt to force this condition by forcible movement, or even by prolonged massage. The proper treatment is rest. But in any case the trouble is likely to persist for a long time, and there will probably be some loss of range of movement.

A third source of disappointment is the *formation of adhesions*. These can and should be prevented by early recognition of the nature of the condition and treatment. It calls for exercises, and if necessary the breaking down of the adhesions under gas. In the case of the shoulder-joint, there is no tenderness on direct pressure over the outlines, and movement, the most painful in one, differs from that in another. This distinguishes it from the arthritis just described. No bone needed to be moved, yet there is still a positive heat or redness in or around it.

Good early diagnosis, including a skiagram, and proper treatment [illegible] is able to give a fairly accurate prognosis, except for the

[illegible] of attitude [illegible] [illegible] [illegible] to be [illegible] [illegible] [illegible] [illegible] [illegible] usually [illegible] well.

Dislocations. *Apart from treatment* a dislocation is bound to [illegible] a great deal of disability, but in the case of [illegible] [illegible] young adult and [illegible] a very fair degree of [illegible] [illegible] [illegible].

[illegible] *[illegible] dislocations* [illegible] operative [illegible] [illegible] much less favourable than those of immediate [illegible] but sometimes a very [illegible] useful point is obtained [illegible] shoulder, [illegible] ever [illegible] be preserved. [illegible] [illegible] 11 cases of unreduced dislocation of the shoulder [illegible] excision and examined several years afterwards. Of [illegible] more than half obtained a fair but not perfect result [illegible] always marked limitation of movement. The best [illegible] [illegible] in a child.

[illegible] *reduction* by manipulation is, of course, the best [illegible] [illegible] possible and in the majority of cases leads in [illegible] [illegible] three months to a perfect cure, at any rate in patients [illegible] given proper treatment after reduction. Of [illegible] [illegible] [illegible] of the shoulder investigated [illegible] the [illegible] [illegible] Hospital, 10 obtained a good result, 5 fair and 1 bad. [illegible] cases in children may be said to do very well; in middle-aged [illegible] people there will probably be some permanent limitation [illegible].

[illegible] favourable prognosis however has to be guarded against [illegible] each of the complicating factors which we have passed in [illegible] spoiling the prospects of a cure after a sprain may also [illegible] after a dislocation. There are two other unfavourable [illegible] to be added to the list: first after some dislocations and [illegible] those of the hip *the muscles may be so torn* as to lead [illegible] lameness, and second, dislocations of the shoulder, [illegible] patella, and clavicle sometimes show a remarkable *tendency to* [illegible].

[illegible] of the clavicle and patella relapse is not very serious, [illegible] may become a great nuisance to the patient if the jaw or the [illegible] keeps on getting out of point. It is related that a certain [illegible] barrister was subject to the former affliction and had some [illegible] to be taken when in the act of addressing "my lord" [illegible] [illegible] which occasions he used to envelop his face in a handkerchief [illegible] overcome by emotion, and hurry from the court. He [illegible] the reputation of being full of sympathy for the woes of [illegible].

[illegible] dislocation of the shoulder is prone to occur in [illegible] [illegible] has recently published a series of 18 shoulders treated [illegible] [illegible] [illegible] the capsule. In [illegible] of these a cure was obtained [illegible] a further dislocation occurred, but only as the result of

[illegible] such as in wrestling; in 2 cases the operation was [illegible]. Lessons taught: use of a posterior approach to the joint. [illegible] were pleased with the end result, some of them more [illegible] by exercises and massage.

Disarticulation at the elbow is satisfactory, followed by [illegible] in the beneficiary [illegible].

3. **Perforating Wounds.**—Given prompt diagnosis and therapeutic action a few hours, [illegible] or long gradual recovery can [illegible] with at worst a certain amount of stiffness.

Many wounds of joints do not lead to suppuration, and the prognosis is then approximately that of a sprain. But if septic arthritis [illegible] the injury [illegible] on the third or fourth day, the outlook [illegible] the joint is grave indeed, and even the patient's life may be [illegible]. Repeated incisions for drainage may fail to give relief, pyæmia often supervenes, and at last in despair both patient and surgeon are [illegible] to end the struggle by an amputation. If this [illegible] avoided, bony ankylosis will probably take place, with or without displacement.

References.—Sorrell and Barney, *Ann. Surg.*, 1909, xlix, 696. Wood, *Lancet*, 1909, ii, 138–219. Thomas, *Surg. Gyn. and Obst.*, 1914, xxiii, 107. *J. Roy. Inst.*

JOINTS, TUBERCULOUS. (See ARTHRITIS, TUBERCULOUS.)

KALA-AZAR. This term was first applied to the epidemic fever which carried off about one-third of the inhabitants over some two hundred miles of country in Assam in the course of twenty years. The mortality among several hundred carefully recorded cases at Dods Price on tea gardens, varied from 96 per cent early in the outbreak to 78 per cent latterly, the disease being thus almost as deadly as sleeping sickness. Subsequently kala-azar was found to be endemic in Bengal, Bihar, and parts of Madras (having been previously confused with malarial cachexia); the case mortality in Bengal being certainly less than in the Assam epidemic; but accurate figures cannot be given, as only the worst cases come to hospital, and it is very probable that a fair proportion of the more chronic cases recover spontaneously. It is probably between 60 and 75 per cent, but possibly lower. A form of the disease especially affecting children occurs in North Africa; the mortality is less than in the Indian variety.

Death rarely occurs from the actual fever, but nearly always from some complication, of which the most deadly are cancrum oris (especially in children) and other septic infections, pneumonia, dysentery (usually bacillary), cirrhosis of the liver, hæmorrhages, and occasionally phthisis, all of which are extremely fatal in emaciated kala-azar subjects. In Calcutta, 82·5 per cent of fatal cases showed one such terminal affection post mortem.

Apart from such complications, early cardinal signs are extreme emaciation with persistent loss of weight, especially if diarrhœa is

[illegible] great enlargement of the liver, as well as of the spleen, with [illegible] of the veins of the anterior abdominal wall, sometimes with [illegible] cirrhosis of the liver, oedema of the lower extremities, petechial hæmorrhages in the skin, and great anæmia.

For the most important and to the prognosis is the degree of [illegible] present, and especially the reduction in the total number of [illegible] leucocytes. Cases showing 1000 or less leucocytes, and [illegible] with under 250 total polymorphonuclears per cubic millimetre, [illegible] over, while the prognosis improves with every increase in number, until at 4000 white corpuscles are present in a typical case free from any temporary leucocyte-increasing complication, the prognosis is fairly good. In cases which recover, the most favourable are steady gain in body weight, which may occur in spite of [illegible] low intermittent fever, and a rise of the leucocytes towards normal number. Once a patient, who has been much emaciated, [illegible] fat in the face, recovery is practically assured, however large the spleen may still be, although this also subsides in time and often [illegible] beneath the ribs. Recovery is permanent in spite of continued residence in the endemic area, as proved by the scores of coolies who for years on tea gardens in Assam after recovery from severe kala-azar. Although cancrum oris and other septic infections and pneumonia are very deadly if, as is usually the case, they [illegible] no marked and lasting increase of the leucocytes, yet in the cases in which the leucocytes rise to or above the normal in such [illegible], early and permanent recovery not rarely ensues. Some [illegible] have been reported by the writer following leucocyte-[illegible]sing measures, especially injections of staphylococcus vaccines. [illegible]-increasing drugs may also apparently be of some use in the [illegible] stages, although they fail in advanced ones.

During the last two years the outlook of kala-azar patients has [illegible] greatly improved by the report of a number of consecutive cures [illegible] been effected, both by Italian writers in the African form, [illegible] independently by the writer and others in Indian kala-azar, by [illegible]ntravenous injections of tartar emetic, and there is good reason [illegible]pe that a specific for the disease has at length been discovered.

Leonard Rogers.

KIDNEY, INJURIES OF. (*See* ABDOMINAL INJURIES.)

KIDNEY, MOVABLE.—We have to consider the outlook from the [illegible]nt's point of view, first, apart from operation, and secondly, when [illegible]ted on by some of the many methods now in use.

[illegible]s well known that the doctor often finds a movable kidney in the [illegible] of a routine examination, when there have been no special [illegible]toms connected with it, and it frequently happens that nothing [illegible]r heard about it. On the other hand, severe pain or a wearying [illegible] of drag may make the patient's life a misery.

[illegible] number of secondary consequences may appear.

1. *Dietetic Causes.*—[illegible]

2. *Intermittent Hydronephrosis.*—A [illegible] pain, and a large quantity of water is passed. [illegible]

3. *Neurotic Causes.*—[illegible]

4. *Wandering Kidney.*—According to Sarcking, 10 per cent of all women attending a neurological clinic have a movable kidney. [illegible] symptoms are relieved by its fixation so that he takes it to be [illegible]. The great majority of English surgeons, however, [illegible] unless there is definite evidence [illegible] to the kidney.

The prospects of cure by various forms of pads, belts, and corsets are difficult to estimate. Treves states that infection cases cut off twenty, and in some relief from Lane's apparatus, and that it may be left off after two years, but other experience is much less favourable, and the patients frequently declare that the pain is no better, or that the pressure is intolerable.

Results of Operation for Movable Kidney.—The death rate is not very serious. Edebohls collected records of 846 cases from the literature, with a mortality of 1·65 per cent. Billington has operated on 515 patients, of whom 1 died. At two Bristol hospitals there was 1 death (from sloughing at the wound) in 104 cases. Probably the mortality is about 1 per cent.

Reliable end results are not easy to obtain, most authors giving very vague details or only following the cases for a few months. Keen mentions 116 patients whose condition was investigated afterwards, but in some cases this was only three months after the operation. He found 58 per cent cured, 13 per cent better, and 29 per cent without relief, but details are lacking.

Wilson and Howell examined 41 cases who had had various operations at St. Bartholomew's Hospital at least a year previously. Twelve were quite cured and 8 greatly improved; 9 were no better. The most cases did better than the chronic. In several patients the kidney had broken loose again, but nevertheless there was considerable relief.

Billington has followed up two series of his undertaken. In the first 57 cases were examined without knowing a year after the operation, 60 per cent were almost or quite cured, 20 per cent much better, 10 per

[illegible] and 10 per cent no better. In a second series of [illegible] 92 [illegible] were reported to have improved or to be much better. The [illegible] [illegible] per cent. [illegible] however, [illegible] Great surgeons would not consider it [illegible] complaints of the [illegible] [illegible] the methods, [illegible] and [illegible]. He [illegible] and compared with [illegible]. He [illegible] to enable a judgment of the [illegible] of the kidney [illegible] Goelet's statistics.

[illegible] of Copenhagen reports on a series of [illegible] patients [illegible] to twelve years previously. Out of these 107 were [illegible] [illegible] movable kidney, showed 85 per cent were quite [illegible] [illegible] cent better, 4 per cent no better, and 2 died of the operation. In [illegible] compared by patients appointed [illegible] 50 per [illegible] cured, 25 per cent better, 22 per cent no better, and 3 per [illegible] died of the operation. The method was [illegible] [illegible] It is probable that patients with mild symptoms, as [illegible] [illegible] would judge. These were submitted to operation.

[illegible] has collected the results of nephropexy at the Geneva Hospital [illegible]. He investigated 57 cases up to four years afterwards and found that 33 per cent were cured, 10 per cent better, 57 per cent [illegible]. In 23 per cent the kidney was [illegible]. The method [illegible] varied. He points out that the patients cured were all [illegible] before operation by a very significant [illegible] that the [illegible] were relieved when they lay down. Thomson Walker has [illegible] the same observation.

[illegible] the discussion by the Royal Society of Medicine in 1911 the [illegible] of three London hospitals presented reports on 83 patients [illegible] more years after operation. Of these 52 per cent were cured [illegible] greatly improved, 12 per cent better, and 36 per cent no better.

Ends of Operation for Movable Kidney

[illegible] and Howell	41	49	29	22
[illegible]	87	60	30	10
Uncomplicated	137	85	9	4
Complicated	64	40	25	22
[illegible]	57	33	10	57
[illegible] hospitals	83	52	12	36
[illegible] hospitals	69	58	18	24

[illegible] writer has investigated the end results of 69 operations at two [illegible] hospitals under the care of various surgeons. Of these 10 were [illegible] as far as the kidney trouble was concerned, but some still had

[illegible] operation. In each of the other 4 cases (1–4) were not improved. Seventeen cases were undoubtedly improved (including 1 one patient [illegible] to have a dilated stomach). Another suffered from pain without hydronephrosis. Interesting the kidney appears to have [illegible] twice again, but nevertheless 5 of these are much improved. Relief of pain took place in particular [illegible] weeks, four months, [illegible] 3 years and two years after operation. In the last case the kidney slipped during a sudden cough, but the symptoms have [illegible] gradually passed off again. Cases associated with hydronephrosis are not discussed.

Although the number of cases is small, some evidence is forthcoming as to the best method of operating. Four procedures are represented:

1. *Transcutaneous Suture.*—Catgut or silk suture being passed through the kidney substance and the muscles, or over the last rib. The failures are 5 out of 11, which is a large proportion; 2 kidneys become loose again.

In 18 cases the kidney was sutured to the muscles with catgut. In 3 it is not clear whether the cortex or the capsule was pierced. Of these 11 were cured, 4 relieved, and 3 no better.

2. *Suture of Capsule.*—In 8 cases the capsule was sutured to the muscles with catgut. Here again the results were good, and 2 worse than before.

3. *Phenol and Sling.*—The kidney was painted with pure carbolic acid, and an iodoform gauze sling put in beneath the lower pole, and left for fourteen days. The end results are quite good, only 3 out of 19 failing. One case (not examined) is said to have relapsed. The writer has seen laceration of the kidney, with haemorrhage and escape of urine, follow removal of the gauze.

4. *Gaehl's Method.*—The capsule is secured by two mattress sutures of silkworm gut passing through the muscles and skin at a higher level. Only ten cases appear, but the results are not so good as the last-named.

END RESULTS AFTER VARIOUS OPERATIONS.

Suture to muscles	40	22	7	11
Transcutaneous suture	[illegible]	[illegible]	[illegible]	[illegible]
Suture of capsule	[illegible]	[illegible]	[illegible]	[illegible]
Phenol and sling	19	12	4	3
Gaehl's	10	6	2	2

We may conclude, therefore, that by nephropexy probably 50 per cent will be cured, but one in three or four will not be relieved at all. Better selection of cases will doubtless improve on these results in the future, and, in particular, operation is not advisable unless the pain is relieved by recumbency. The third and fourth methods just mentioned

[illegible]

[illegible]

KIDNEY, NEW GROWTHS OF. [illegible] in considering the prognosis of renal new growths.

The Malignancy of Kidney Growths. A [illegible] in the Lancet have been described. Some of these [illegible] known to develop [illegible] at a later date [illegible] has removed a kidney. The [illegible] patient who died [illegible] years and proved to be papillomatous growth from the renal pelvis which [illegible] by an eminent pathologist and pronounced malignant. Cases of papillomata of the renal pelvis are on record [illegible] had been present for twenty years and functioned a [illegible] before operation. The writer also knows of a case where [illegible] after removal was published as an adenoma of the kidney; [illegible] patient afterwards developed multiple bony metastases from [illegible] to died within two years. The number of growths that remain [illegible] must be quite insignificant.

[illegible] new growths of the kidney should therefore be looked upon [illegible] as malignant. Some variation is said to exist in regard to [illegible] management of the different forms of malignant growths [illegible] kidney, and an opinion based on this might be given after [illegible] and examination of the kidney. Hypernephroma is believed [illegible] less rapid in its course as compared with sarcoma and carcinoma [illegible] kidney. It is, however, unwise to make definite statements [illegible] upon the histological varieties. The new growths grouped [illegible] the name of hypernephroma show, in some cases, a rapidity [illegible] spread and metastatic deposit that is not exceeded by any [illegible] other forms of renal growth.

The Duration of the Disease. Cases are recorded where [illegible] had been present for eight (Ikronlem), twelve (Strech), and [illegible] (Lomeau) years before operation was performed. The [illegible] duration of the illness from the commencement of the symptoms to the fatal issue is, however, much less than this. It was [illegible] and a quarter years in 32 cases collected by Gareau, and two [illegible] a half years in 40 cases collected by Richards, while Keen [illegible], and Ellis found an average of two and three-quarter years. [illegible] duration of the disease is shortened by the appearance of metastases. When extensive metastases are present in vital organs such [illegible] lungs or liver, the patient will only survive a few months.

Results of Operation.

Immediate Results. The operative mortality, including under [illegible] deaths occurring immediately or any time during the first [illegible] months after the operation, has been much reduced during the

not absolutely; but it will compare with compound cyst [illegible] for that disease.

[illegible] 123 cases with 28 deaths, a mortality of 22.7 per cent. [illegible] 144 [illegible] with 33 deaths, a mortality of 24 per cent. The mortality [illegible] in the last few years. [illegible] 11 per cent [illegible] the Mayo [illegible].

[illegible]

[illegible] The operation performed for [illegible] of the kidney should aim at the removal of the perirenal fat and the lymphatics included in the perirenal fascia, which should if possible remain unopened, and should be traced to the great vessels.

A collection by Watson and Cunningham of 145 nephrectomies for malignant growth of the kidney showed the following results: Death from operation, 33; death later, after operation, 43; survived, 34; not stated, 36.

The 43 cases that died later after the operation were distributed as follows: one year or under, 22; one to two years, 11; two to three years, 6; three to four years, 1; four to five years, 1; seven to eight years, 1; ten to eleven years, 1. Death, these authors note, has

[illegible] than in [illegible] [illegible] the patient [illegible] [illegible] before [illegible].

[illegible] following [illegible] the [illegible] of [illegible] after operation [illegible] [illegible] that remained well [illegible] periods [illegible] [illegible] year to three years, 1 [illegible] four years, 2 [illegible] five years, 2 [illegible] years, 1 [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] two years [illegible] 25 remained well and [illegible] [illegible] [illegible] [illegible] [illegible] of all the patients who survived the operation [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] per cent. remained well [illegible] [illegible] of [illegible] [illegible] 10 patients were known to be well. [illegible] [illegible] [illegible] that the [illegible] [illegible] [illegible] [illegible] [illegible] better than those of the operation [illegible] [illegible] [illegible] and quite [illegible] to those [illegible] operations.

[illegible] [illegible] [illegible] [illegible] in the Mayo clinic showed 10 per [illegible] living at the end of [illegible] years.

[illegible] 20 cases recorded by [illegible] 10 remained well for longer than [illegible] years.

[illegible] **Age**.—The statistics already quoted are for new growths of the [illegible] adults. In children, a number of factors combine to make [illegible] operation [illegible] higher, and render the probability of [illegible] [illegible] greater. [illegible] occurs in only about 10 per cent. of cases [illegible] [illegible] present until after an abdominal tumour is discovered. [illegible] result, diagnosis is only made after the growth has reached [illegible] dimensions. It follows that the operation is always of [illegible] character, while the age of the patient renders him less [illegible] to withstand severe surgical procedures.

Walker puts the general mortality in children from operation and [illegible] at 33·22 per cent. Albarran and Imbert give the mortality [illegible] operations as 25 to 30 per cent., Simon at 32 per cent., and [illegible] [illegible] as 12·44 per cent. Recurrence in patients surviving the operation takes place, according to Albarran and Imbert, in 81 per cent. [illegible] [illegible], and Simon states the percentage of recurrence as 67. Recurrence usually takes place rapidly, and appears within the first year. Occasionally it may be delayed, and cases where the growth [illegible] three, four, and even five years after are on record.

[illegible] has collected 11 cases in good health a year or more after operation, among which the longest were: Israel five years, [illegible] [illegible] years, Schmidt three years, and [illegible] and Rovsing each two [illegible]. Recently Bastianelli recorded a case well four years after operation. The longest survival of which I have definite information [illegible] case operated upon by Mr. J. D. [illegible] in November, 1892, [illegible] was well in February, 1911, eighteen years and three months [illegible] operation. [illegible] of New York, recorded two cases of prolonged survival: in one the patient died of new growth of the remaining [illegible] four and a half years after operation; the other patient was [illegible] and well over ten years after operation. Notwithstanding such

tumors, the prognosis in children is very grave, and some surgeons even advise against operation.

3. **Clinical Points in estimating Prognosis.** The important points to take into consideration are the probability of spread beyond the capsule, the function of metastases, the general condition of the patient, and the condition of the second kidney.

Spread beyond the capsule is indicated when the kidney is fixed, or is very irregular in outline. Free mobility is a favourable sign, but a large renal growth which is fixed to the liver or diaphragm shows a considerable range of vertical mobility with respiration. A large growth may appear fixed, yet be confined within the capsule of the kidney, but the detection of fixity in a small renal growth is significant of pericaval spread.

Pain, constant or localized, or radiating along nerves, indicates nerve pressure outside the kidney. Renal colic from clot obstruction should be carefully distinguished from this.

The appearance of varicocele on the side of the growth is due to the engorgement of the pericaval veins, but does not necessarily indicate spread of the growth beyond the kidney. It disappears after nephrectomy, and should not be considered a contra-indication to operation. Hochenegg states that if the varicocele does not disappear in the genupectoral position, it is due to compression of enlarged glands, and the growth is inoperable.

Metastases are most commonly deposited in the lung, liver, lymph glands, and bones, and care in examination of these, including radiographic examination, should be made.

Cachexia rarely appears unless the growth is advanced, and has spread beyond the kidney. The cardiac muscle is frequently affected by toxins from the growth, and cardiac failure immediately or some time after operation is not uncommon. **Dilatation of the heart, with a feeble, irregular, unequal pulse, is a contra-indication for operation.**

As regards the second kidney, the **urine should be obtained and examined.** A trace of albumin and **a few tube casts are frequently present, and they disappear after nephrectomy; but if there are signs of advanced nephritis, and of a reduced renal function, operation is contra-indicated.** Bilateral growths are rare. They occur especially in childhood.

J. W. Thomson Walker.

KIDNEY, POLYCYSTIC. This condition is almost invariably bilateral. **Luzzato collected 226 cases, of which only 11 were unilateral.** Legueu found only 2 out of 63 cases were unilateral, and Ritchie only 2 out of 72 post-mortems. The disease is invariably fatal, but the duration may extend over many years. Josserand found that the age at death in 187 cases was as follows:

Age	Cases	Age	Cases
10–20 years	2	50–60 years	17
20–30	13	60–70	17
30–40	26	70–80	11
40–50	60	80–90	2

nephrectomy has a very high mortality. Seiber found an operative mortality of 32·7 per cent in 60 cases. Of the 41 cases that survived operation, only 8 were known to be alive after three years. The best survivals were 4 after three years, 1 after eight years, 1 after [illegible] years, and 2 after seven years. *J. H. Thomson Walker.*

KIDNEY, TUBERCULOSIS OF. Primary tuberculosis of the kidney is said to be present when the kidney is the part of the urinary system first affected. It is obvious, however, that unlike the lung, the kidney cannot be directly infected by the tubercle bacilli from without, but must always receive the infection secondarily from some tuberculous focus elsewhere in the body. The nature and activity of this extrarenal tuberculous focus have a considerable influence upon the prognosis.

In the majority of cases of renal tuberculosis that come before the surgeon, either no other tuberculous focus can be found, or, at most, it is quiescent or obsolete. In most cases no other lesion can be discovered clinically. Post-mortem evidence goes to show, however, that in such cases the primary focus lies in a tuberculous bronchial or mediastinal lymphatic gland. In other cases there is a history of old-standing but apparently long-quiescent tuberculosis of bones, such as Pott's curvature, or old sinuses connected with bones, or there are ankylosed joints or a foot has been amputated, or knee excised. In such cases the tuberculosis of the kidney may be considered on its own merits, for the other foci affect hardly at all the future progress of the disease.

In a smaller number of cases there is active tuberculous disease in some other part of the body. A typical example of this is active pulmonary tuberculosis. Here the prognosis is dominated by the pulmonary condition. In such cases the outlook is very grave, and the patient usually succumbs in about two years, though occasionally the symptoms of only a few months' duration. Less unfavourable cases are those in which the active tuberculosis is in a position where local treatment is possible, such as the bowel, the epididymis, or the cervical glands. When, however, there are found a number of foci of tubercle distributed over the body—as, for instance, where there are cervical tuberculosis, bilateral tuberculous epididymitis, tuberculosis of the gut, and possibly evidence of bygone tubercle of the lung—the chance is so low that the results of operation are unfavourable, and the outlook under general treatment is very grave. Rectal tuberculosis with tuberculous epididymitis is not uncommon, and is usually so serious. Radical operation may be successful in permanently curing the disease.

The remarks which follow, being tuberculosis is considered as primary in the kidney, with no active tuberculous lesions elsewhere, unless specially mentioned.

Can Tubercle of the Kidney Heal Spontaneously? A few writers hold the view that a kidney which has been the seat of

tuberculous disease may heal spontaneously, but the great majority of those competent to judge believe that when tuberculous disease attacks a kidney it is not arrested until the organ is totally destroyed.

In support of the view that spontaneous healing may occur, three scars, some of which show calcareous deposit, have occasionally been observed. It is not certain that such scars are of tuberculous origin, but even should this be so, the few cases that have been recorded suffice to show that such an outcome is rare. A portion of the kidney affected with tubercle may be shut off from the rest of the organ by occlusion of that segment of the pelvis, and clinically, this corresponds to a disappearance of the pus and tubercle bacilli from the urine. After a time, however, another part of the kidney is infected, and symptoms reappear. It is not unusual to find, at operation, that one part of the kidney, corresponding to a division of the pelvis, is distended with tuberculous material, and is isolated by occlusion of the outlet, while more recent active tubercle is seen in the open part of the kidney. Finally, the whole kidney may be distended with fluid or with semi-solid tuberculous material, and the ureter be plugged and occluded, so that the entire organ is destroyed and shut off from tubercle. The tuberculous disease is now quiescent or dormant. It may be stated that, short of complete destruction of the organ, tuberculous disease of the kidney does not, with the rarest exceptions, heal spontaneously.

2. **Is Tuberculosis of the Kidney Unilateral or Bilateral?** Renal tuberculosis is unilateral in the earlier and very frequently bilateral in the later stage. This accounts for some discrepancy between the statistics of different observers. Israël states that 82 per cent., Albarran 80 per cent., Bramann 86 per cent., and Legueu 85 per cent. of cases are unilateral, and clinical evidence obtained by catheterization of the ureters, and the results of nephrectomy certainly support this view. Such statistics must always be subject to the qualification that they apply to the early stage. In the later stage the disease, in a large proportion of the cases, is bilateral. Post-mortem statistics, given by Caulfield show 57 per cent., by Israël 62 per cent., and by Hahn and Motz 35 per cent. bilateral.

If [illegible] *secondary to the primary*? Do the bacilli come from the same focus as those that attacked the first kidney? Direct evidence on this point is very difficult to obtain, but the results of nephrectomy in unilateral renal tuberculosis show that the second kidney is infected, not from the original primary focus, but from the first kidney. During the first two years after nephrectomy for tuberculous kidney, there is a mortality of 10.6 per cent. from tuberculosis of the remaining kidney. The tuberculous disease in the great majority of these cases, if not in all, was present at the time of the nephrectomy. If the mortality due to tuberculosis of the second kidney after surviving two years be examined, it is found to be only 3 per cent. It [illegible] compared with the 35 to 62 per cent. of infection of the second kidney, with rare [illegible] where no operation has

performed, the influence of nephrectomy upon the prognosis of the second kidney will be realized.

The Introduction of Sepsis. Infection of a tuberculous kidney by pyogenic organisms may result from blood-borne bacteria, but more frequently it is an ascending infection up the ureter from a bladder infected by catheterization. Pyonephrosis very frequently results, and the patient is dangerously ill. Nephrectomy alleviates urgent symptoms, and should the second kidney be healthy, nephrectomy can be performed at a later date with a good prognosis for recovery. If the bladder is infected, there is a danger of ascending pyelonephritis of the remaining kidney.

Results of Medicinal, Climatic, and Tuberculin Treatment.

The *administration of drugs* has no effect upon the progress of the disease, but symptoms such as pain and bladder irritation may be alleviated.

Climate which is warm and dry, with an even temperature, alleviates some of the more distressing bladder symptoms which occur in renal tuberculosis; but climatic treatment does not materially influence the progress of the disease.

Tuberculin treatment gives varying results. In some cases of unilateral renal tuberculosis, with or without involvement of the bladder, considerable benefit has resulted from prolonged administration of tuberculin. After one or two years, tubercle bacilli and all signs of inflammation have disappeared from the urine, and there has been no immediate recrudescence of symptoms. Information obtained by cystoscope and by operation upon such cases shows that the tuberculous focus has become isolated by occlusion of a part of the pelvis, or of the entire pelvis, by closure of the ureteric orifice. The occurrence of the tuberculous disease in other parts of the genito-urinary tract is to be expected in such cases, and it is a mistake to suppose that the temporary disappearance of signs or symptoms means a permanent cure.

In bilateral renal tuberculosis, tuberculin has a more restricted use, as curative operation cannot be undertaken. Improvement takes place in a good proportion of cases under tuberculin treatment, but I have not seen any case of cure.

In cases where there is tuberculosis of one kidney with tuberculosis in other parts, tuberculin treatment is often of value, either in conjunction with nephrectomy, or apart from operation. After nephrectomy, tuberculin treatment of genital tuberculosis is specially successful.

When tuberculosis of the kidney occurs with other tuberculous lesions, lungs, bones, and joints, tuberculin treatment does not give encouraging results. In some cases an improvement in general health takes place; but the extent of the lesions in the kidney may even appear to increase under the treatment.

In estimating progress in the treatment of tuberculosis of the kidney by tuberculin, attention should be paid to the presence of

[illegible]

[illegible]

5. **Immediate Results of Operation.** [illegible]

[illegible] 515 [illegible] 7·18 per cent. [illegible] 2·85 per cent.

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

6. **Late Results of Operation.** [illegible] 15·2 per cent. [illegible] 324 [illegible]

It may be stated therefore that there is a risk amounting to 10·6 [illegible] of the patients dying of tuberculosis during the first two [illegible] and a risk of 2·9 per cent. of a fatal result from tuberculosis thus. *J. H. Thyne.*

KIDNEY AND URETER, CALCULUS OF. In the early stage [illegible] disease of the kidney, there is a tendency of a small stone [illegible] impacted in the ureter and causing anuria. In the later [illegible] sepsis and uræmia are the chief conditions to be feared. The following factors are intimately concerned with these dangers, and are [illegible] important in estimating the prognosis: (1) *The size and number of calculi.* (2) *Unilateral and bilateral calculi.* (3) *Infections;* (4) *Results of operation;* (5) *Recurrence of calculi.* (6) *Bilateral anuria.*

1. **The Size and Number of Calculi.** In the early stage a primary calculus of the kidney is single and small, and the kidney is healthy, or [illegible]. Slight interstitial and parenchymatous changes, described by Ayaran under the name of diathesic nephritis, may be present, but it is probable that if the calculus is removed early, no serious permanent damage to the kidney will remain.

At this stage the chief danger is impaction of the calculus in the pelvic outlet, or in the ureter, during an attempt to expel it. When obstruction is incomplete or recurrent, a hydronephrosis results. If the impaction is sudden, and obstruction complete, there is [illegible] of anuria (calculous anuria) resulting. The prognosis in these [illegible] is discussed elsewhere.

As the calculus increases in size, pressure upon the kidney substance [illegible] interstitial nephritis and atrophy, until eventually, in the case [illegible] large calculus, the kidney substance is reduced to a mere shell [illegible] renal function is now carried out entirely by the second kidney. If this should fail, uræmia follows.

At any period in the history of a renal calculus, but especially when [illegible] becomes larger, or there are a number of calculi present, there is [illegible] of infection being superadded. The infection usually occurs [illegible] ously, and the path by which it arrives is the blood-stream (endogenous infection). Occasionally it follows septic catheterization and washing out the bladder (ascending infection). The influence [illegible] complication on the prognosis will be discussed later. Removal [illegible] calculus in the early, small, aseptic stage can be performed without [illegible] destruction of renal tissue, and will prevent [illegible] complication.

[illegible] use of the *x* rays in diseases of the urinary organs has been the [illegible] of greatly improving the prognosis in calculus of the kidney and [illegible]. In the early stage a small stone will show a shadow on the [illegible] and its exact position is demonstrated. It is thus possible [illegible] with certainty, and to extract the calculus with a minimum [illegible] of destruction of kidney tissue. When multiple calculi are [illegible] their number and position are [illegible] shown on the plate. [illegible] shadow is accounted for at the operation by a corresponding

[illegible] the danger of overlooking a small calculus is thereby greatly reduced. By means of the extra pelvic the operative measures required can usually be planned beforehand. Thoroughness and rapidity in operating are thus facilitated. When the calculus lies in the ureter, it frequently happens that the symptoms attend no guide to the exact position of the impacted stone. In such a case an exploratory operation, which may be of a very formidable character, is avoided by the discovery of a shadow in the line of the ureter on the plate.

From the foregoing it can be stated that a good prognosis is justified when the calculus is single, aseptic, and of moderate size, and the condition is cured without any unnecessary and extensive measures. The prognosis is much less favorable, and may be very grave, when there are large, multiple, and septic.

2. **Unilateral and Bilateral Calculi.** When one kidney contains a calculus, the most frequent form of disease that affects the second kidney is the development of a calculus on this side also. In the early stage of calculous disease bilateral calculi are not very common, but in the later stage the second kidney is frequently the seat of calculus.

Israel found bilateral calculi in 27 per cent., Guyon in 16.6 per cent., Kocher in 11.78 per cent., and Morris in 10 per cent. of cases operated upon. Legueu found calculi in both kidneys in 50 per cent. of 79 post-mortem cases. The latter may be taken to represent the late stage of the disease, while the former gives an indication of the frequency of bilateral calculi in the early stage. When the more general use of the stethoscope and of radiography, the occurrence of stone in the kidneys is being made at an earlier date, and the number of bilateral cases likely to be reduced.

The consequences of bilateral calculi depend upon the extent of the disease and the presence of sepsis. The development of calculi in the second kidney, when one kidney is already affected, is a grave complication. There are cases where stone, aseptic calculi are formed in one kidney and passed at intervals. In such cases the kidneys appear to act like a lime-kiln, as the calculi pass over from one to the other. The chance of trouble from impaction of a calculus is, however, larger, and the prognosis after operation, however, and the course of the disease, shorter than in unilateral calculus.

When one kidney is the seat of a large calculus or of multiple calculi and the second kidney contains a small calculus, when large calculi are present in both kidneys, and when bilateral calculi are infected, the prognosis is very grave. Nephrectomy in any of these conditions is unwise, and a permanent cure after removal of the calculi is unlikely. In very large bilateral calculi it is a question if the patient will not have a stone and no kidney, without operation. In such cases, recurrence of stone after removal is frequent, and after an operation there is very considerable destruction of renal tissue. The mortality of repeated operations on bilateral calculus is much higher than in unilateral.

In 22 unilateral cases of calculous disease where fatal issue followed operation, there were calculi in the second kidney in 12, atrophy and

[illegible] in 4, the organ was the seat of fatty disease in 2, amyloid [illegible] in 1, hydronephrosis in 2, and interstitial nephritis in 1.

In order that the prognosis may be estimated in any case of renal [illegible], a careful examination must be made of the second kidney [illegible] by means of the x-rays, and the condition of the urine, and activity of the renal function of the second organ, must be ascertained by examination of the urine, and by the use of the tests of the [illegible] function after catheterization of the ureter.

Kuster reports 20 cases of operation on bilateral calculi, in 10 of [illegible] a good result followed. Anuria persisted in 3 cases, and there [illegible] 7 deaths from uremia. Legueu had 8 double operations, [illegible] died of uremia, and 7 recovered. Of the 7 survivors, 2 died [illegible] within a year.

Asepsis and Infection. At some period in the history of uncomplicated calculus, infection occurs. In rare cases, large bilateral [illegible] develop in both kidneys and run their course till the final [illegible] with nothing more than the very mildest infection of the [illegible] occurring. Usually, however, the urine is contaminated with

NEPHROLITHOTOMY IN HEALTHY OR SLIGHTLY INFECTED KIDNEYS.

Bergmann	17	0
Nussbaum	18	0
Zuckerkandl	8	2
Rovsing	115	7
Kaufmann	21	2
Israel	61	9
Kuster	160	15
Legueu	20	2
Total	420	37

NEPHROLITHOTOMY IN INFECTED KIDNEYS.

Schmieden	211	43
Kuster	251	50
Bergmann	2	2
Nussbaum	1	3
Legueu	5	1
Total	472	100

B. coli communis or with a mixed infection. In some cases calculi develop in an already infected kidney. The prognosis in renal calculus is much graver than when the kidney remains aseptic. The mortality of operation is higher, the probability of recurrence greater, and the destruction of kidney tissue is much more rapid.

I cannot quote the statistics given in the tables on the previous pages in regard to these operations on aseptic and on infected kidneys.

4. **Results of Operation.** The results of operation for renal calculus are governed by a number of factors, such as the size and number of the stones, the condition of the second kidney, the presence or absence of sepsis, the operation performed, and, it may be added, the experience and skill of the operator, for a successful operation has demanded a high degree of both.

Some of these have already been discussed, while others require elaboration. It remains to compare the results of the different operations under various conditions.

The operations performed for renal calculus are (a) nephrolithotomy, (b) pyelolithotomy, and (c) nephrectomy.

a. *Nephrolithotomy.* The results of nephrolithotomy are largely influenced by the presence or absence of sepsis previous to the operation. Some authorities, notably Morris, regard as cases of nephrolithotomy only those in which the kidney is healthy and there is no infection. Most surgeons look upon as cases of removal of calculi from the kidney as cases of nephrolithotomy.

The results in cases uncomplicated by sepsis or dilatation show a very low death-rate. Watson collected 135 cases with 3 deaths (2.2 per cent.), and Rovsing, 115 cases with 7 deaths (6.08 per cent.). Other results have already been quoted.

In infected cases the mortality is high, as the results of Schmieden (20.3 per cent.) show. After nephrolithotomy the wound usually heals rapidly, even when mild suppuration has been present. In infected cases a fistula may persist, and this is occasionally due to calculi having been left in the kidney pelvis, or to ureteral obstruction. In Schmieden's cases uninfected, a fistula followed the operation in 22.2 per cent., while in Watson's collection infected and noninfected there were fistulæ in 8.9 per cent.

b. *Pyelolithotomy.* This operation is confined to a small class of cases where there is a small or moderate-sized calculus occupying the renal pelvis or calices, or where the pelvis is comparatively long and too low, but not too deep. In Schmieden's statistics there are 54 cases of pyelolithotomy, of which 36 (66.7 per cent.) were completely healed. There were 12 (22.2 per cent.) recoveries with fistula, and 6 (11.1 per cent.) died.

In the writer's experience, the percentage of fistula following nephrolithotomy and pyelolithotomy, given in the statistics quoted, is much too high.

c. *Nephrectomy.* Nephrectomy for calculus is, compared with the operations already discussed, a rare operation, and is reserved for

[illegible] where the calculi are very numerous and large, and where the [illegible] is atrophied or destroyed by [illegible] or when malignant growth [illegible] the calculus.

[illegible] nephrectomy may be called for in [illegible] pyelitis and renal haematuria [illegible]. The [illegible] the operation [illegible].

[illegible] statistics [illegible] Watson [illegible] 1[illegible] cases, 41 deaths (30·1 per cent) [illegible] cases, 6 deaths (1[illegible] per cent).

Recurrence after Removal.—The recurrence of calculi in the kidney after an operation for their removal depends upon a number of factors. Incomplete removal of the stone or stones at the operation is a frequent cause. A deep loin with a narrow space between the rib and the iliac crest; a large, fleshy kidney with a short, inelastic pedicle; multiple calculi; an inefficient x-ray examination; carelessness and inexperience on the part of the operator; these are factors which have an important bearing on the incomplete removal of stones. Occasionally an aseptic, single, hard stone may be chipped in removal, and the tiny fragment form the nucleus of a fresh concretion. This is much more likely to occur where the calculi are multiple and branching.

Sepsis is a prolific source of recurrence, phosphatic stones being rapidly re-formed even after complete removal. The repeated formation of oxalate-of-lime stones, and of uric-acid stones, either after expulsion along the ureter and discharge from the bladder, or after operation, is the unfortunate habit of some patients, and the underlying diathetic condition is very difficult and sometimes impossible to control.

Calculous Anuria.—Calculous anuria results from the impaction of a small stone in the ureter of one kidney, the second kidney being absent, atrophied, or diseased in varying degree. Rarely the ureters of two functional kidneys are simultaneously blocked by calculi. If the anuria is untreated by operation, death occurs in 71 per cent of cases according to Legueu, and in 67 per cent according to Donnadieu. Death takes place usually about the tenth or twelfth day, after two or three days of uræmic symptoms. In cases that have recovered, the date of spontaneous relief was the third day in 1, the fifth to the tenth in 10, the thirteenth in 1, the fourteenth in 1, the fifteenth in 1, and later than the fifteenth in 2.

Operation should be performed at the earliest possible moment in all cases of calculous anuria. It has been held that the operation may be delayed until the fifth or sixth day, as uræmic symptoms seldom supervene before that time. This delay could only be justified by a large proportion of spontaneous recoveries, and such does not exist. Death, if it take place, is a result, not of the operation, but of the condition for which the operation was performed.

[illegible] reported [illegible] had the mortality [illegible] 25 per cent. before the [illegible] 12·1 per cent. [illegible] operations [illegible] operation under [illegible] have been recorded.

Watson collected 2[illegible] cases of [illegible] and found the following results:—

Treated without operation: 110; deaths 80; mortality 72·7 per cent.

Treated by operation: 75; deaths 31; mortality 41 per cent.

These results [illegible] of good [illegible] early and rapid operation [illegible].—*J. B.* [illegible]

KNEE-JOINT, INJURIES OF THE.—Year by year we obtain a more complete knowledge of the many serious consequences of an injury to the knee-joint, and we are gradually becoming more competent to [illegible] and treat them.

Fractures of the patella and long bones are considered elsewhere. We have here to discuss the methods in the following conditions: (1) *Synovitis and hæmarthrosis*; (2) *Ruptured ligaments*; (3) *Dislocation of the knee and the patella*; (4) *Internal derangement of the knee-joint*; (5) *Penetrating wounds*.

1. **Synovitis and Hæmarthrosis.**—The signs of these conditions are well known, but it is often impossible at first to decide whether the effusion constitutes the whole trouble, or whether there is also some injury to bone, ligaments, or cartilages; and the prognosis depends principally on this very point. In all but the slightest cases a skiagram should be obtained to show any bony lesion, such as a fracture of the patella or of the condyles, separation of the tibial spine, or a loose body composed of bone and cartilage detached from a condyle. Marked lateral mobility, with tenderness over one or other condyle, points to tearing of the lateral ligaments. Rupture of the ligamentum patellæ is usually obvious, and the patient is powerless to extend the knee. Anteroposterior mobility, either in extreme flexion or extension, is a sign of tearing of the crucial ligaments.

Whenever evidence is obtained of one or another of these injuries, it is necessary to expect prolonged disability and perhaps an imperfect result. Even when no special signs are present beyond [illegible] synovitis, it is impossible to promise a completely permanent recovery, because there may be [illegible] of tearing of a semilunar cartilage.

Apart from this, however, it is usual for a simple synovitis of the knee to be restored to function in a month in mild cases and in two to three months in severe cases, assuming that the treatment is efficient: rest and cold applications or pressure at first, followed by massage, and, when the acute inflammatory signs pass off, exercises and movements.

If considerable effusion comes on within an hour of the injury, and

Ruptured Ligaments.

Dislocations.

Internal Derangement of the Knee.

[illegible]

[illegible]	17	16	1	0	0
[illegible]	7	2	2	2	1
[illegible]	8	1	2	1	1
[illegible]	3	1	1	0	1
[illegible]	5	2	1	1	1
Total	40	[illegible]	7	4	4

It will be observed that when there was a definite lesion of the semilunar cartilages the results are almost uniformly excellent. [illegible] patients are able to play football again and several are miners. [illegible] does his work with comfort after having parted with both his internal

[illegible] In one case the injured cartilage was removed, [illegible] to recurrence. It has been performed [illegible] in one of our patients, but he had to come to have the cartilage [illegible]

The [illegible] of loose body. Though it is [illegible] [illegible] Apparently a loose body [illegible] [illegible] the operation, and in one of [illegible] loose body [illegible] [illegible] [illegible] [illegible] out of 8 of our cases. In [illegible] that a loose body [illegible]

[illegible] that the operation for internal [illegible] [illegible] [illegible] followed by the [illegible] in the [illegible] cases, where the cartilage is [illegible]

[illegible] *Fat-pad* is due to repeated bruising and [illegible] between the bones and produces [illegible] [illegible] [illegible] and a little fullness beneath the patellar [illegible] It will not [illegible] improved until the leg is fixed in [illegible] [illegible] months for a chance of recovery. There is no bracing and [illegible]

Perforating Wounds of the Knee.—The vital element in the [illegible] after this injury is, of course, the occurrence of suppuration [illegible] degree. Provided that this can be avoided, the joint will be [illegible] to normal in a few weeks. If suppuration take place, there [illegible] probably be one or two months spent in bed, and a permanently [illegible] following, though fortunately it is usually not painful.

[illegible] small proportion of the cases the inflammatory reaction is [illegible] and the patient suffers a desperate illness, with, it may be, the [illegible] of pyæmic abscesses and occasionally a fatal result. This [illegible] nearly always be averted by early and efficient cleansing and [illegible] In such bad cases, the knee may ankylose at right angles [illegible] remain painful; the writer recollects seeing one patient who, after [illegible] operations and narrowly escaping death from pyæmia, finally [illegible] to suffer amputation.

[illegible] Gunshot Wounds, see p. 302).

[illegible] D'Arcy Power, *Brit. Med. Jour.* 1911, i. 61; A. Readle [illegible] *Royal Med. Chir. Jour.* 1912, 52.

A. Readle Short

KNEE, TUBERCULOUS. (*See* Arthritis, Tuberculous.)

LARYNX, CARCINOMA OF. — In this disease it is necessary to [illegible] cases into the two following classes: (1) *Intrinsic*, i.e., those [illegible] from the vocal cords true and false, the interarytenoid region, [illegible] epitrichles, and the subglottic region; (2) *Extrinsic*, i.e., those [illegible] from the upper aperture of the larynx and from the back [illegible] cricoid cartilage.

1. **Intrinsic Carcinoma** is not very malignant in type. Owing to the arrangement of the lymphatics within the larynx, which do not communicate with those of surrounding parts but empty into a pair of small glands on either side, glandular infection is uncommon, and metastases are so rare as to be practically nonexistent.

Growth is often slow, and, in the absence of treatment, cases have been recorded in which life has been prolonged for ten and thirteen years respectively.

Treatment is essentially surgical, and consists in either intralaryngular removal through the natural passages, or opening the larynx by thyrefissure. The former operation is generally condemned, and no statistics are available, although 7 cases of removal with no recurrence for three years are reported by Frankel, while in 5 cases operated on by Schmiegelow[1] recurrence took place in 2.

Removal of intrinsic laryngeal carcinoma by thyrefissure probably now the most successful operation in the surgery of malignant disease. Only recent figures must be considered, as, owing to improvements in technique, results have become better of late years.

Results of Thyrefissure in Laryngeal Carcinoma.

Tilley	15	1	1	3	0
Semon	25	1	4	11	3
Jackson	14	0	[illegible]	1	3
SMCarTh[illegible]	10	0	4	1	2
Rubin	21	1			
Kessler	5	1	1		
Schmiegelow	20	1	9		
Total	100	8	29	25	8

Thus, in 100 operations, the mortality as a result of operation was 8 per cent. Of 79 cases observed for over one year, there was no recurrence in 54, or 68 per cent.; while in 38 cases observed for more than three years, a cure was established in 25, or 65 per cent.

Semon has given reasons for considering that if recurrence has not taken place in one year it will not do so.

Thus, the results show an operative mortality of 8 per cent., with cure in over 65 per cent. or 68 per cent. compared with figures for operation on the breast of an operative mortality of 5 per cent. and a cure in 42 per cent.

As a result of this operation, owing to the formation of a cicatricial band in replacing the cord which has been removed, the patient is left with a fair voice. Thus, in 28 cases [illegible]

[illegible] was good in 11, fair in 5, and only a whisper in 4 cases, which [illegible] states that in all his cases the voice was fair except where [illegible] had taken place.

Extrinsic Carcinoma has a very much more serious prognosis [illegible] spreads to surrounding parts, glandular infection occurs [illegible] and life is seldom prolonged beyond three years without operation, death usually taking place from aspiration pneumonia.

[illegible] is the only *treatment* which holds out any hope of cure. [illegible] number of cases, however, do not come under observation [illegible] late a stage.

[illegible] operation consists of a partial or complete laryngectomy, [illegible] accompanied by removal of a portion of the œsophagus [illegible]. The great risk of the operation is aspiration pneumonia, [illegible] risk has been diminished recently owing to the method of [illegible] off the tracheal opening from the septic pharyngeal [illegible].

[illegible] cases, the glands on either side should be removed with the [illegible]. Recurrence in glands is the most frequent form met with [illegible]. I have combined together figures for partial and [illegible] removal of the larynx, as, from the point of view of prognosis [illegible] operation, one frequently cannot tell how much of the larynx [illegible] necessary to remove.

PARTIAL OR COMPLETE LARYNGECTOMY.

Kocher	13		4
Schmiegelow	9	6	4
Semon	5	4	0
Gluck	84	5	20
Jacksonb	8	0	3
Crile	24	2	
Barlow	7	4	
Delavan	56	29	

[illegible] of 193 cases operated on, the mortality as a result of [illegible] was 44, or 22.7 per cent, whereas a result of operation [illegible] a cure was obtained in 28, or 22.5 per cent.

Binns' cases, as a result of figures collected for complete [illegible] since 1890, an operative mortality of 19 per cent, with [illegible] from recurrence of 28 per cent in cases discharged from [illegible] after operation, 4 10 per cent from one to three years after [illegible] 4.19 per cent over three years after.

[illegible] an operation with a mortality of about one fifth of the [illegible] a prospect of a total or less permanent cure in about [illegible] cases.

As a result of the operation, except in a few cases in which some very partial removal of the larynx has been performed, the patient [illegible] speechless. A voice whisper may be developed by using the [illegible] the pharynx [illegible] the ground, [illegible] those who are in constant contact with the individual. In addition, expression of the pharyngeal [illegible] may be in some considerable difficulty [illegible].

There is [illegible] owing to the impossibility of an effective cough, [illegible] an increased liability to bronchial and pulmonary affections, and the impossibility of using the chest to close the [illegible] makes a constant labour difficult, if not impossible. All these disadvantages [illegible] a condition of great mental depression.

In considering the advisability of this mutilating operation, [illegible] must be remembered that the condition is a patient disease [illegible] and [illegible] and [illegible] become necessary.

R. [illegible] *Lancet*, [illegible] 1874. [illegible] *Lancet*, [illegible] 1876. [illegible] *Lancet*, [illegible] 1880. [illegible] *Lancet*, [illegible] 1882. [illegible] *Medical Press*, [illegible]

[illegible] H.

LARYNX, PAPILLOMA OF. This condition usually arises in infancy or childhood. In the occasional instances the growth has persisted for a prolonged period. As a rule, at some time, frequently about puberty, the growths will spontaneously disappear. This is not, however, always the case, and cases have been recorded in which the condition persists for months and thirty-five years. The alternative *treatments* are:

1. *Surgical.* (a) Local removal through the natural passages. (b) Removal by opening the larynx from the exterior: (c) Tracheotomy.

2. *Medical.* The internal administration of calcined magnesia in large doses.

3. *Radiant applications.*

The great risk of the condition is asphyxia, and many of the cases have to be tracheotomized for acute dyspnœa when first seen.

1. **Surgical.**

a. Local Removal through the Normal Passages.—This is the treatment now most commonly adopted, the operation being performed by the direct method, and frequently accompanied by the application of the cautery or caustics to the base of the growths. It will relieve the symptoms for a time, but the growths almost always recur and the operation has to be repeated many times until eventually recurrence ceases. A case has been recorded in which operation was performed 17 times. It is almost without risk to life.

b. Removal by Direct Incision.—This method, formerly much employed, is rarely used now. If cases are seen early enough

[illegible] than the former method, although a greater risk to life [illegible]. It is too serious an operation to be lightly repeated, [illegible] case is recorded in which it was repeated 17 times without [illegible].

Laryngofissure. In a large number of cases this has to be performed as a matter of urgency. It has also been thought that it will [illegible] cure by giving rest to the larynx, but it is doubtful if this [illegible] cases have been recorded in which the growths persisted [illegible] and thirty-five years, in spite of this operation.

Medical.

Calcined Magnesia. The administration of this remedy in laryngeal [illegible] has been recently tried. Cures are recorded by Chase,[1] Dorr,[2] [illegible] a total of 5 cases, all of which had been under treatment by other methods. Rose,[3] however, reports failure in 2 cases. The [illegible] therefore on its trial.

Radium. This has been tried on 2 cases recently by Delavan,[4] Avery,[5] with complete success.

[illegible] has collected records of 13 cases treated by himself and [illegible]. In all the growths disappeared, but recurrence took place [illegible].

[illegible] radium, if obtainable, would seem to give the best hope of an [illegible] cure. Calcined magnesia may cure in some cases, and [illegible] Tracheotomy is often necessary, but will not cure of [illegible]. Local removal is almost without risk, and can be repeated [illegible]. It is impossible in any given case to say when cure will occur.

[illegible] [1]Packard, *Ann. of Otol. Rhinol. and Laryngol.* 1910, Sept.; [illegible] *Bull. Acad. Méd. de l'Ouest*, 1912, March, 19; [illegible] Tilley, *Ann.* [illegible] Ann. 218; [illegible] Semon, *Proc. Laryngol. Soc. Lond.* 1894, Jan. 1, 62; [illegible] *Passow Ohr. Laryngol. Beilg.*, 1910, July; [illegible] Massini, *Ibid.*; [illegible] *Méd. de l'Ouest*, etc. XXXI, p. 1; [illegible] Rose, *Arch. Laryngol.* 1913, 38; [9]Delavan, *Ann. of Otol. Rhinol. and Laryngol.* 1910, Sept.; [illegible] 1912, Sept. 470; [11]Harris, Int. Congress of Medicine, 1913.

[illegible] J. Berger.

LARYNX, TUBERCULOSIS OF. — Laryngeal phthisis is for all practical purposes only a complication of pulmonary tuberculosis. The prognosis is essentially that of the lung condition. The disease usually occurs when the pulmonary condition is advanced, and the prognosis is always grave, the mortality being about 90 per cent.

[illegible] the laryngeal and lung conditions usually progress [illegible] together, not infrequently cases are seen in which the larynx improves under treatment while the lung gets worse, and the [illegible]. The situation of the disease in the larynx is of importance; [illegible] cases in which the epiglottis is involved have an the worst [illegible] partly because of the dysphagia and consequent difficulty [illegible] food, and partly because epiglottic involvement usually [illegible] which the lungs are extensively diseased. Lale and Barwell[1] [illegible] following figures of the number of health-giving power [illegible] cases were under observation:

Mortality in Laryngeal Tuberculosis.

Epiglottis	72	11	1 in 6
Arytenoids	148	16	1 in 9
Vocal cords, alone	35	1	1 in 35

The results of general treatment are those of pulmonary tuberculosis, except that the prognosis is always considered worse by the presence of laryngeal disease. Sanatorium figures are unreliable in this respect, as the majority of laryngeal cases have pulmonary disease too far advanced for sanatorium treatment. Cases of healing of the larynx under tuberculin are recorded by Williamson, Parker and Blumenfeld, and the latter gives the number healed by this treatment as about 5 per cent.

The medicinal treatments are directed solely to the healing of the laryngeal disease (above). The use of various pigments and caustics, Pfannenstill's nascent iodine method, the galvanocautery, diathermy and x-rays, removal of disease with punch forceps and curettes, and major operations such as tracheotomy and laryngectomy.

For the relief of the most distressing symptom, dysphagia, without any idea of cure, amputation of the epiglottis and the blocking or section of the superior laryngeal nerve have been employed.

Silver, in conjunction with sanatorium treatment, has met with some success. Felix Simon and Bacelwell[2] have recorded 7 and 6 cases respectively in which healing of the laryngeal condition took place under these conditions.

SOLIS Thomson records arrest of the laryngeal disease in 37 out of 178 cases (20.7 per cent), with sanatorium treatment and some assisted in 15 of them by local applications of the galvanocautery. These were all selected cases.

The use of lactic acid and other pigments is less employed than formerly, and although isolated cases of healing have been described, they are few, and no statistics are available.

Pfannenstill's nascent iodine method,[3] in which the patient inspires ozone while taking large doses of iodides, has been employed on a limited number of cases. The inventor has cured 2 patients on whom he tried the method, and Tidestrom obtained healing in 8 out of 12 cases. But Stangenberg only found slight improvement in 1 case out of 4 treated, so that the method is at present on its trial.

The galvanocautery also produced healing in a number of isolated instances. X-rays and diathermy have only been used in exceptional cases.

The active local treatment by punches and curettes has been largely employed. Herzog in the treatment of 974 cases obtained healing, lasting for from one to six years in 20 cases, or 7.8 per cent; and

[illegible] out of 211 cases, obtained healing in 20 per cent, but these [illegible] only watched for a short period, and were not seen after [illegible] hospital.

[illegible] operations are seldom employed, and the results have usually [illegible] effects. Gluck gives

MAJOR OPERATIONS.

[illegible]	7	1	[illegible]
[illegible]	2	2	6
[illegible]	20	4	13

[illegible] collected cases of laryngostomy. [illegible] found that only [illegible] were alive a short time after operation.

[illegible] of the epiglottis in cases in which it is adherent and [illegible] of dyspnœa, will usually relieve this symptom, and is [illegible] without risk to life.

AVULSION OF EPIGLOTTIS.

Heat	24	0	100
[illegible]	151	0	84
Mercier	25	0	100

[illegible] of pain by the section of the superior laryngeal nerve, or [illegible] alcohol into the nerve in order to block it, has been [illegible] and largely used recently, and no risk seems to accompany [illegible] method. The relief of pain, in the case of alcohol injection, lasts about thirty days, and the injection can be repeated.

ALCOHOL INJECTION OF SUPERIOR LARYNGEAL NERVE.

[illegible] Turner	1	1
[illegible]	15	[illegible]
Hunt	3	[illegible]
Bernard and [illegible]	6	[illegible]
[illegible]	2	2
Total	27	26

Blumenthal has recorded 2 successful cases of [illegible] of the nerve.

Thus, Lateral Tuberculosis is a serious complication of a serious disease. Cases with extensive involvement bear the worst prognosis. Cases in which the lung condition remains stationary, or improves, were usually dealt with silence and tuberculin treatment. Calcareous and other operative measures have assist healing. Most operative measures are disappointing. Removal of the epulotic and blocking of the superior laryngeal nerve give certain relief from dysphagia without risk, in suitable cases.

Bibliography: Lake and Barker: *Laryngeal Phthisis*, 1905. Zarniko: *Laryngoscope*, [illegible]. Sewell: *Brit. Med. Jour.*, 1906, [illegible]. Gardner: *Lancet*, 1907. [illegible] *Med.*, 1914, April 11. Hanson: *Dublin N. Jour. Med. Sci.*, [illegible]. Schmiegelow: *Laryngoscope*, [illegible]. *Lancet*, 1909.

[illegible]

LATERAL SINUS THROMBOSIS. (See INTRACRANIAL COMPLICATIONS OF EAR DISEASE.)

LEAD POISONING.—Metallic lead and practically all its salts are poisonous. Even the sulphate and chromate are soluble in the gastric juice, and it has been found that the addition of 1 per cent pepsin increases the solubility of the metal and of white lead. Probably the most harmful compound is Pb_3O_4, while there is only one insoluble and therefore harmless salt, viz., the sulphate. The mechanical as well as the chemical composition of the salt has some bearing on prognosis, for a less soluble salt may be more dangerous than one which is more soluble but less easily powdered. Individual susceptibility is very marked, e.g., one man in a white lead factory began to have symptoms in two weeks, and died of acute pituitosis after five and a half months' work. In the same factory was a man who had worked in white lead for thirty-two years and had felt no ill effects. Probably about a quarter of all workers are not susceptible. There appears also to be a family susceptibility, hence the son of a lead poisoned father and mother should avoid all work connected with lead. Females are more susceptible than males, especially if they are anæmic. The disease is liable to be very much more severe if there is a constant absorption of small quantities of the poison over a lengthened period than if a large quantity is taken on a single occasion. Further, when lead is absorbed into the respiratory tract by inhalation, the onset of the symptoms is frequently earlier, and they are of a more severe character, than when it is absorbed from the alimentary tract. In connection with the length of time of exposure necessary before symptoms arise, A. Hamilton, in an analysis of 120 cases, found 1 case of paralysis at the ended one week's work, 1 case of colic at the end of one week's work, 1 case of colic with tremors after [illegible] days, and the workers became [illegible] in less than four weeks, in less than a month, and Seven in less than a year.

[illegible] have a worse prognosis than first attacks. Lead, once [illegible] into the system, may remain latent for long periods, and [illegible] itself felt. These symptoms of lead poisoning may [illegible] for the first time after a man has given up all lead work for [illegible] months, and in certain cases even a few years have intervened [illegible] the earliest warning of the symptoms. One attack predisposes [illegible] It is not possible, however, to assert positively that a patient [illegible] recovered from an acute attack, as insidious disease of [illegible] the internal viscera, such as kidneys or heart, may have [illegible] developed.

[illegible] to the prognosis of lead colic, the outlook is [illegible] good, provided there is no excess against [illegible] [illegible] is exceedingly [illegible] the patient may [illegible] the [illegible]

[illegible] symptoms are dangerous, especially if the patient becomes [illegible] Epileptiform fits may follow each other in rapid succession [illegible] total. If the patient rids over these attacks, recovery [illegible] from complete, and blindness and aphasia may follow. [illegible] cerebral condition may also be permanently deranged, or mental [illegible] defective; lead may be responsible for a [illegible] resembling general paralysis. As a rule, however, the onset [illegible] more rapid and the prognosis very much [illegible] Considerable improvement may occur even in the third stage; the [illegible] paralysis, ataxia, and the intellectual faculties [illegible] becoming more clear. Much mental irritation, however, may persist even in the most favourable cases. Hemiplegia [illegible] occur with, or apart from, these cerebral symptoms. About 50 [illegible] of those who develop this eye trouble get permanent [illegible] [illegible]. In the hemiconsecutive form, the prognosis as to ultimate [illegible] depends much on the intensity and duration of the paralysis, [illegible] or not there is persistent atrophy, and on the state of the [illegible] reactions. Paralysis of the deltoid, biceps, brachialis anticus [illegible] supinator longus occurs in the long established cases, and hence [illegible] prognosis is worse in this form than in the usual forearm type. [illegible] very severe cases paralysis may extend to the muscles of the [illegible], the diaphragm, and even the intercostals, and so produce fatal [illegible] of respiration.

[illegible] pseudo-tabes, recovery is sometimes remarkably rapid [illegible] incoordination, loss of muscle sense, and ataxy have been [illegible].

[illegible] cachexia form undermines the general resistance of [illegible] rendering it more prone to intercurrent infections. It [illegible] also by inducing chronic disease of the internal viscera, [illegible] of the kidneys, arteries, and heart. It also predisposes to [illegible] all its various manifestations. Lastly, plumbism leads to [illegible], with its own dangers. *J. R. C.*

LEISHMANIASIS.—See KALA-AZAR.

LEPROSY.—Leprosy has hitherto been considered an incurable disease, although considerable and sometimes prolonged improvement may take place spontaneously. The majority of cases run a very chronic course of many years duration, terminating with some intercurrent disease. A few cases, especially of the tuberculoid type, have an acute course with fever, the patient succumbing to the disease in a few months with extensive lesions in the internal organs. Among these cases many die from the effects of burns indirectly due to loss of sensation.

The only remedy known to influence the disease in some degree is chaulmoogra oil, although the effect when it is taken by the mouth is usually only temporary. Heiser has reported several apparent cures after prolonged intramuscular injections of the oil, while Rogers records great improvement, and in one case apparent cure, from the oral, subcutaneous, and intravenous injections of the soluble gynocardates prepared from the oil, but it is too early to say if these methods will materially improve the prognosis of the disease. *[illegible]*

LEUCOCYTHEMIA.—No question with regard to leukæmia can be discussed without some preliminary understanding of normal haematology employed.

It has been customary to classify cases into the splenomedullary and lymphatic types. It is now recognized that the enlargement of the spleen is a passive process, and consequently the first term is often spoken of as medullary or myelogenous. In recent years there has been a growing tendency to distinguish between ordinary large and small lymphocytes on the one hand, and large and small myeloblasts on the other. These latter can be demonstrated, by special methods, to have a more regular chromatin network and more nucleoli than the lymphocytes, and they are regarded as the precursors of the granular myelocytes, neutrophil, eosinophil, and basophil, which in turn develop into polymorphonuclear leucocytes with the corresponding type of granule.

It is unnecessary for our present purpose to discuss the relationship of these cells, but it is necessary to point out that cases of "myeloblastic" leukæmia are not infrequently recorded as myelogenous. We are not disposed to quarrel with this, but if such a description leads to the belief that these "myeloblast" leukæmias are to be classed in the same category as the granular leukæmias as regards symptoms or prognosis, then either the description is unfortunate or the belief is wrong.

We may perhaps best get over the difficulty by classifying the leukæmias in terms of the characters of the predominating cells as regards the presence or absence of granules. If the cells which are markedly increased are non-granular, it is a matter of little practical importance whether they are to be labelled lymphocytes or myeloblasts.

We thus have to deal with (1) *Lymphatic (non-granular) leukæmia.*

Case is usually acute, rarely chronic. (2) *Medullary* [illegible]. This is usually chronic, very rarely acute. (3) *Mixed* [illegible] *Leukæmia*.

Lymphatic Leukæmia. In the great majority of cases run an acute course. An early fatal result is the usual outcome; the rarely exception [illegible] occasional transition of a case from the acute to the chronic type of the disease. Some cases end fatally within forty [illegible] of coming under observation; the greatest number die [illegible] the fourteenth and thirtieth days, and an intermediate [illegible] for from three to six months. Among the symptoms [illegible] indicate an early termination are sudden [illegible] and high [illegible].

The early onset of hæmorrhages is a serious symptom. Once [illegible] a definite tendency to bleeding, an early fatal termination [illegible] certain. A single hæmorrhage from the nose or other [illegible] and has not such serious significance, but when bleeding [illegible] nose and gums, hæmatemesis, or hæmatoma has appeared, [illegible] to be persistent. Purpura may occur, and a hæmorrhagic [illegible] may lead to the formation of a hæmatoma. Advancing [illegible] is another very grave omen. The anæmia is not merely due [illegible] hæmorrhages, but to the unchecked proliferation of lymph[illegible] in the bone-marrow. The onset of diarrhœa weakens the patient; [illegible] the absence of more serious symptoms it is not of much signif[illegible] in this form of the disease. Attacks of pneumonia or pleurisy [illegible] occur, and may determine an early fatal issue in a case which [illegible] might have lasted a few months. Rupture of the spleen [illegible] hæmorrhagic, which has occurred.

[illegible] necrosis, ulceration, and the formation of diphtheritic [illegible] on the gums or cheeks, may lead to a condition of profound [illegible]. Hæmorrhages into the eye or ear may lead to blindness [illegible] deafness.

Little significance can be attached to changes in the leucocyte [illegible]. It is certain that a falling count is no indication of improve[illegible]. A falling lymphocyte percentage would be a favourable omen, [illegible] have never known it take place.

No known form of treatment has any beneficial influence on the course of the acute cases. Very aggressive drugs harm.

In the chronic form the spleen is enlarged and there is also great [illegible] of the lymphatic glands. Indeed, the enlargement, [illegible] that of the spleen, may be taken as an index of the progress [illegible] of the case.

The liver also enlarges, and lymphomata may occur in the skin and [illegible].

Excretion, in the chronic form, are much larger as a rule than in [illegible], but the actual figures have little relationship to the course [illegible] disease.

A fatal result is sooner or later to be expected. Duration in most [illegible] does not exceed a year, but chronic cases lasting for several,

and [illegible] made marked progress. [illegible] after [illegible] in the onset of [illegible] [illegible] only. On the other hand, [illegible] a [illegible] in five years. [illegible] that the [illegible]. We [illegible] appeared to be [illegible].

The [illegible] leukæmia [illegible] good, and has had the [illegible]. In [illegible] appears to be [illegible]. We [illegible] the use of [illegible].

2. **Medullary Leukæmia.** Prognosis [illegible]. In the usual chronic form it is difficult to [illegible] duration, on account of the insidious onset. Most [illegible] live for at least [illegible] after they first came under observation. They probably [illegible] within five years.

The course of the disease is not uniformly progressive, and remissions and relapses are often seen. When [illegible] occurs, the spleen usually diminishes in size and the leucocyte count falls, but the blood picture generally retains its pathological qualitative features. In some cases [illegible] without improvement of any kind in the blood or the size of the spleen. The subject of myelocythæmia is liable to severe [illegible]. Fatal hæmorrhage has been known to follow such [illegible] or the extraction of a tooth. [illegible] is a troublesome symptom, and may persist to such an extent as [illegible]. Pressure by enlarged glands [illegible] may give rise to [illegible] symptoms. Intercurrent disease may have a remarkable influence on the blood picture. The leucocyte count may fall to normal as the result of an attack of influenza, and in some cases the count becomes subnormal.

Such complications do not much influence the general course of the disease. The most serious complications of a chronic disease, such as pneumonia and pleurisy, are uncommon in myelocythæmia, possibly on account of the large number of polynuclear cells in the blood.

Myelocythæmia occasionally runs a very acute course. In these cases the duration is from fourteen days to eleven months.

Effect of Treatment. In the x rays we have a powerful agent for controlling the symptoms of myelocythæmia. Their effect is not curative, but the excessive output of leucocytes may be temporarily checked, the [illegible] probably [illegible] to some extent from the packing of the [illegible] with white cells, and their functions are for the time being improved.

The treatment may succeed in establishing remissions on successive occasions, but [illegible]. In all cases the application [illegible] be closely checked by the examination, not only of the leucocytes, but of the red cells also. It is possible to carry on the

[illegible]

Mixed Forms. [illegible]

[illegible]

Chloroma. [illegible]

[illegible]

LICHEN PLANUS. It is difficult to lay down any criterion [illegible] to base a prognosis in this disease. Except in a few cases of [illegible] type which develop rapidly and tend to clear up in a few weeks, [illegible] planus is apt to be progressive, and may last for many months; [illegible] course may be shortened by treatment, and the most important [illegible] in the successful management of the severe cases is discipline, both mental and bodily. Chronic patches of the disease are [illegible] treated by the x-rays, or by radium applied on a flat plate. The

LIP, CANCER OF

Prognosis apart from Operation

[illegible]	896	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	114	[illegible]	196	[illegible]	[illegible]	[illegible]
[illegible]	70	0				
[illegible]			29	2	[illegible]	[illegible]
[illegible]			11	[illegible]	[illegible]	[illegible]
[illegible]			12	2	[illegible]	[illegible]
[illegible]			99	2	[illegible]	[illegible]
[illegible]			12	2	[illegible]	[illegible]
[illegible]			10	[illegible]	[illegible]	[illegible]
[illegible]			12	[illegible]	[illegible]	[illegible]
[illegible]			21	[illegible]	[illegible]	[illegible]

[illegible]

Mortality of Operation. [illegible]

The Prospect of Cure. [illegible]

Date and Place of Recurrence. [illegible]

[illegible]

[illegible]

LIVER ABSCESS. See Abscess of Liver; Amœbic Liver Abscess; Dysentery.

LIVER, ACUTE YELLOW ATROPHY OF. [illegible]

Medical Treatment. Recovery has been recorded after repeated transfusions of saline solution in a few cases, and the treatment of acute intoxication by transfusion with sodium bicarbonate and dextrose containing sugar should improve the outlook. In one case to which I gave horse serum, which lessens antitoxic action, on the ground that the hepatic change is due to autolysis, recovery followed. But it is obvious that no real conclusions can be based on an isolated observation.

Liberal prophylactic treatment in cases which may possibly precipitate acute yellow atrophy has some bearing on the prognosis. The jaundice in pregnant women should contraindicate chloroform anæsthesia in childbirth, and the use of chloral and chloretone, as chloroform causes autolysis of the liver cells, and should call for the prevention of acidosis and constipation. The benign jaundice which may occur in secondary syphilis readily yields to mercury, and the method of treatment may therefore be regarded as a means of preventing the onset of the rare acquired acute yellow atrophy. [illegible]

[illegible]

Prognosis in Individual Cases.—[illegible]

Diagnostic Signs.—[illegible]

[illegible] *Wissenschaftl. Ergeb. Inn. Med. und Kinderheilk.*, 1910, [illegible] F. W. Weber, *Brit. Med. Jour.*, 1905, [illegible] 1296. [illegible] *Proc. Roy. Soc. Med.*, 1909, [illegible] *Proc.*, vol. [illegible] 113.

H. D. Rolleston.

LIVER, CIRRHOSIS OF.—Under this heading the following [illegible] will be considered:—(1) *Portal* (or *Balsoug*, or *hypertrophic*) and (2) *Suppurative*.

I. Portal Cirrhosis.

Synonyms: Multilobular, Alcoholic, Laennec's cirrhosis.

[illegible] subject will be treated in the following order: first some [illegible] considerations on the prognosis of the disease, then the [illegible] of hæmatemesis, of jaundice, and of ascites and its treatment, then the influence of treatment generally on prognosis, and [illegible] prognosis in individual cases.

[illegible] change is often latent, for in about half the cases in [illegible] cirrhotic liver is found at necropsy, death is due to other [illegible]. The prognosis is thus much better than in biliary cirrhosis, [illegible] taken account the greater frequency of cirrhosis in males, the [illegible] less often latent in females, possibly because alcoholism [illegible] established is even more difficult to control than in males; [illegible] a comparatively early age appears to be favourable as [illegible] greater tendency to improvement, provided alcoholic excess [illegible] probability because the nutrition is better preserved and

[illegible]

Hæmatemesis occurs in about one-quarter of the cases. [illegible] severe vomiting and expectorate blood in only about 5 per cent. of the cases during life from the effects of cirrhosis. In Pribram's [illegible] cases of fatal gastro-intestinal hæmorrhage in cirrhosis, death had followed a single hæmorrhage in a third of the cases. As a consequence, unless the patient is allowed to bleed to death, or at a comparatively early period of the disease, it is possible that in this way it exerts a favourable influence on the course of the disease. When, as occasionally happens, [illegible] in the disease and in the presence of ascites, the outlook is very gloomy. The occurrence of a fatal hæmorrhage is usually a grave sign.

Jaundice, which occurs at some time or another in rather more than a third of the cases, may be due to several causes, and its presence [illegible]. Obstruction to hepatic, and of the bile ducts, [illegible] without [illegible] in the stools. In these circumstances it does not exert any special influence on the prognosis. On the other hand, the onset of jaundice in the late stages of cirrhosis is accompanied by fever, [illegible] hæmorrhages, and [illegible] in a very severe [illegible] cases of this character most only generally septic, and are more often seen in comparatively young subjects who have been drinking heavily.

Ascites.– The onset of ascites always makes the outlook bad. It is true that ascites may [illegible] is associated with cirrhosis, especially chronic pericholangitis, and that the prognosis is then not nearly so grave as in ascites due to uncomplicated cirrhosis. But when ascites first appears it is seldom possible to distinguish between these two conditions, though the presence of œdema of the feet before the onset of ascites is in favour of uncomplicated cirrhosis. As time goes on, a decision can be arrived at on the ground that frequent tappings are required in ascites due to chronic pericholangitis complicating cirrhosis, whereas in uncomplicated cirrhosis this is not the case. These points are borne out by the following statistics of Ramsbottom: in 51 cases of uncomplicated cirrhosis, the interval between the onset of ascites and death was on an average 188 days, the average number of tappings two, and the interval between the first tapping and death 46 days; whereas in 32 cases of cirrhosis associated with chronic pericholangitis, the interval between the onset of ascites and death was on an average over 8 days, the average number of tappings 6·7, and the

between the first tapping and death 288 days. For [illegible] cases in which he established the fact that peritoneum [illegible] excreted must be considered for in these [illegible] [illegible] light as to the underlying [illegible] though [illegible] certainly occurs after one or more tappings in patients [illegible] Dieu has also been [illegible] in cases [illegible] other causes, [illegible] after the disappearance [illegible].

Influence of Paracentesis.—Although the prolongation of life [illegible] tapping had become necessary was only 46 days in 31 cases of [illegible] cirrhosis (Ransbottom), there is no reason to believe [illegible] *per se* accelerates the end, for with the present aseptic [illegible] risk of infection of the peritoneum is practically negligible [illegible] with the discomfort and bad effects due to pressure [illegible] exerted by an unrelieved ascites.

Unusual Cases of Ascites.—The prognosis is rendered gloomy [illegible] preceded by great tympanitic distention or by oedema [illegible] as these show that there is grave toxæmia; be the ascites [illegible] fever synchronously with the onset of ascites, as this may [illegible] some complications such as tuberculosis of the peritoneum or [illegible] by concomitant hæmatemesis or melæna or by such [illegible] accumulation after tapping as to require its repetition [illegible] three days, as these events may indicate thrombosis of the [illegible].

Treatment of Ascites of Cirrhosis has taken several forms [illegible] production of vascular peritoneal adhesions, or the Talma [illegible] operation, is the best known. The operation is [illegible] to an advanced stage of the disease with much toxæmia, [illegible] albuminuria, and by definite cardiac or renal disease. On [illegible] cases observed at Calcutta, Rogers considers that [illegible] renders any operation inadvisable. The prognosis is [illegible] the stage at which the operation is performed. But it [illegible] argued that cases in the earlier stages are those which might [illegible] to nature. From analysis of 227 cases, Sinclair White [illegible] that 57 per cent were cured and 13 per cent improved; [illegible] Willems concluded that only 4 per cent out of 250 cases [illegible] successful.

[illegible] operations, such as introducing the omentum into a [illegible] pocket in the abdominal wall (Narath), or establishing [illegible] drainage of the ascitic fluid into the subcutaneous tissues [illegible] abdomen (Paterson) or thigh through the femoral ring (Wyatt; Hartley), entail much less operative shock and have been [illegible] in some cases. Possibly the mechanism by which [illegible] results is on the same lines as in "autoserotherapy," or the [illegible] of ascitic fluid, after its removal, into the abdominal wall, [illegible] 3 dr. every other day, Vitry and Sézary induced [illegible] diuresis and cure of the ascites. Of Reatte's operation, [illegible] consists in making an anastomosis between the peritoneal

[illegible]

[illegible]

The Effect of Treatment [illegible]

In Individual Cases. [illegible]

The [illegible] of the liver in hydatid disease is not of much value in prognosis, for though an enlarged liver due to compensatory hypertrophy is found in fatal cases, it is frequently also found in cases terminating in perfect recovery, and may be temporary and due to some alcoholic excess. The general symptoms must also be taken into account. In the absence of well-marked gastro-intestinal symptoms, a large liver is a favourable sign and vice versa. Since the spleen is usually large and palpable in pneumonia and malaria, and compensatorily small in atrophic cirrhosis, the association of a large liver and spleen is less favourable than a large liver without a palpable spleen.

Occasional albuminuria and a subfebrile state in a small or a large amount of sugar has no special bearing on the prognosis. But in the cirrhotic of hemochromatosis in which diabetes may result, death usually occurs within a year after the onset of glycosuria. The presence of deposits used in the tissue, which is rare in ordinary cirrhosis, shows the presence of acidosis, and is therefore ominous. Very well marked leucocytosis is a grave sign, and from his experience in Calcutta, which has not been confirmed for this country, Rogers considers that a high leucocytosis is a bad sign.

Hypertrophic Biliary or Hanot's Cirrhosis. [illegible]

[illegible] **Obstructive Biliary Cirrhosis.** Fibrosis of the liver [illegible] such [illegible] the larger bile ducts. [illegible] of inflammation of the bile ducts, cirrhosis of the liver [illegible] cases of chronic obstruction of the ducts by gall stones [illegible] in the liver. The prognosis of such [illegible] largely bound up with that of the associated condition [illegible] be considered independently. Due to the complete [illegible] of the ducts the outlook is hopeless and death usually occurs before the eighth month of life. In calculous obstruction [illegible] of the hepatic fibrosis has not become so [illegible] but causes enlargement of the liver and the pericholangitic fibrosis adds to the gravity of the outlook in such [illegible]

[illegible] and [illegible] operation [illegible] is [illegible] contraindicated.

3. Syphilitic Cirrhosis.

In acquired syphilis it is probable that an intercellular cirrhosis resembling the [illegible] known in the congenital form [illegible]; the opportunities for verifying its presence are very rare. It is possible that it may be a causal factor in the [illegible] of [illegible] syphilis, and that when evidence of [illegible] the [illegible] should [illegible] and [illegible]. The [illegible] of intercellular cirrhosis in adults [illegible] that it [illegible] [illegible] and [illegible] [illegible]. It is, however, [illegible] to [illegible] that [illegible] [illegible] [illegible] [illegible] [illegible].

Syphilitic Cicatrices. The [illegible] [illegible] [illegible] [illegible] or [illegible] liver, due to contraction of gummata and syphilitic [illegible] tissue, [illegible] called syphilitic cirrhosis, [illegible] no doubt [illegible] [illegible] symptoms to a [illegible] [illegible] portal cirrhosis. But it would be more accurately described as syphilitic [illegible] than cirrhosis. The prognosis of syphilis of the liver is [illegible] [illegible] [illegible]; but it is [illegible] to remember that [illegible] [illegible] [illegible] under [illegible] treatment sometimes [illegible] [illegible]. Antisyphilitic treatment, [illegible] [illegible] diminishing, and [illegible] [illegible] [illegible] [illegible] a gold [illegible] [illegible] [illegible] [illegible] the existence of syphilitic [illegible] of the liver.

Portal Cirrhosis in the subjects of congenital syphilis, or the occurrence of portal cirrhosis in a [illegible] having formerly been affected with intercellular cirrhosis, [illegible] with the [illegible] [illegible], and that portal cirrhosis is [illegible] [illegible], [illegible] explain [illegible] [illegible] of portal cirrhosis in early life and possibly, though this is difficult to establish, some cases in adults. The prognosis is [illegible] the same as in ordinary cirrhosis in early life.

Intercellular Cirrhosis of Congenital Syphilis.—Prompt and [illegible] antisyphilitic treatment has a most important bearing on the prognosis, not only in curing the condition at the time, but in preventing the occurrence of the delayed congenital results, such as [illegible] and [illegible] [illegible]. Injection of neosalvarsan into the [illegible] is said to be more effective than [illegible] treatment, and [illegible] treatment of the pregnant syphilitic mother by neosalvarsan has a [illegible] good prognostic influence (Findlay and Robertson).

In individual cases the outlook depends on the general condition of the patient and on the degree of enlargement of the liver and spleen, which may be regarded as an index of the severity of the infection. [illegible] haemorrhages and jaundice, which are often due to secondary infection, are very grave signs. Cases with ascites, which is very rare except in infants born with the disease in an advanced stage, are nearly always fatal. The earlier in life the general manifestations of congenital syphilis appear, the graver the outlook.

[illegible] W. B. [illegible] *Lancet* 1909, [illegible] *Jour. Child. Dis.* 1907, [illegible] *Med.* [illegible] 26 [illegible] *Lancet* 1912, [illegible] *Rev. Med.* [illegible] Wallons, *Rev. de* [illegible] Paris 1909, [illegible] *Med.* Paris 1913, [illegible] 5; Rennes and [illegible] *Arch. gén. de Chir.* [illegible] 1911, [illegible] Carmone y Valle, *Gac.* [illegible] *Med.* Paris 1907, [illegible] *Amer. Jour. Med.* [illegible] 1902, [illegible] *Quart. Jour. Med.* 1914, [illegible]

H. D. [illegible]

LIVER, INJURIES OF. —(*See* Abdominal Injuries.)

LOCOMOTOR ATAXY. (*See* Tabes Dorsalis.)

LUNACY.—(*See* Mental Diseases.)

LUPUS ERYTHEMATOSUS.—There are two types of this disease, (1) *Acute*, and (2) *Chronic*.

Acute.—In this form the lesions are erythematous, with little or no infiltration. The eruption develops rapidly, in [illegible] the butterfly areas of the cheeks, the bridge of the nose, the backs of the arms and hands, sometimes the elbows, knees, and ankles, and rarely the trunk. The patients are nearly all young girls or young women. When pyrexia and general symptoms exist the prognosis is unfavourable, and I have seen several cases end fatally. The mortality is about 15 per cent. The fatal issue may be due to pneumonia, nephritis, or pulmonary tuberculosis. In some instances the eruption is hæmorrhagic, and this factor is of grave omen. The prognosis depends mainly upon the general symptoms, and upon the pulmonary and renal condition. In many cases the disease can be controlled, and sometimes cured, by large doses of quinine, but relapses are common.

Chronic.—In the more common localized form, the lesions are limited to a area, slowly spreading from one or more foci on the cheeks, ears, or scalp, or rarely, the trunk. The patches are infiltrated, and more or less scaly or crusted, with a tendency to pucker in their centre and to spread peripherally.

Beginning in adolescence or early adult life, the disease has many variations in its activity, and may last for many years. Even when lesions are quite removed by treatment, or heal spontaneously, it is impossible to promise a permanent cure. The chronic scaly patches are removed temporarily by applications of carbonic acid snow, by scarification, and by the local application of caustics such as iodine, but recurrence is the rule. These recurrences are more common in the winter months and in the spring. Residence in a warm dry climate prevents relapses, but a return to a humid region almost invariably followed by a recrudescence of the eruption. We are in complete ignorance of the cause of the disease, but attention

[illegible]

[illegible]

LUPUS VULGARIS. [illegible]

1 **Involvement of the Mucous Membranes.** [illegible] per cent of the cases seen at the London Hospital and the presence of disease in the nasal cavity, on the palate, on the tongue, or in the pharynx of lupus patients is necessarily the difficulty of treatment, and necessitates a guarded prognosis. It is our experience also that pulmonary complications are more likely to occur in the cases which the upper air passages are involved. When the mucous membrane of the nose and the nasal pouch and gap in the nasal septum are destroyed by the caustic acidity, or caustics, or combinations, treatment of the land [illegible] of the nose is unable to tolerate the caustic acidity, relapses are rife, and secondary involvement of the skin, are the rule. When the cartilage of the septum and lip are involved the bottom as regards permanent cure is less hopeful. The use of a second iodine (Thompson's) injection after operation is of great assistance in preventing recurrence in the intranasal cases.

In lupus of the genitalia, anus, and perineum, the prognosis depends upon the thorough eradication of all the tissue by the surgeon, or by application of caustics, such as iodine [illegible].

2 **The Extent of the Cutaneous Affection.** The size of the area involved depends, of course, on the rapidity upon the extension of the disease, and therefore upon early diagnosis. Large single lesions [illegible] problem of treatment, but if of the dry type the prognosis is not materially affected. Multiple lesions scattered about the trunk, limbs, and trunk, such as occur after the acute exanthems, do not yield so readily as the extensive single lesions cases, but many of these may heal spontaneously if they are of small size.

3 **The Character of the Lesions Ulcerative or Non-ulcerative.** The dry non-ulcerative form responds most readily to the Finsen treatment, and the most permanent results, with the least deformity are obtained in it. X-ray treatment is extremely tedious in this variety, and cure can only be effected at the risk of producing a telangiectatic scar, which may become epithelomatous. The ulcerative form responds readily to treatment by local antiseptics, followed by

[illegible]

The General Health of the Patient and the Condition under which he lives [illegible]

The Treatment [illegible]

[illegible] Wherever light occurs in regions in which the skin has not been fully pigmented, the period of exposure to the sun's rays should be kept within the minimum limit of time necessary for treatment.

Lupus treatment is especially performed where the lesions are situated on the face and on the backs of exposed parts. The patient's health is now assisted by adequate exposure. I have seen 100 cases which have been cured by this method, and which have been from recurrence for from six to seven years. Of 1000 cases treated in the Finsen light department of the London Hospital during fourteen years: 544 were free from recurrence for six to thirteen years. 150 had been well for less than three years. 117 patients require successful treatment, they came to see me from recurrence for a long period, but are able to begin treatment immediately. In 161 cases we were unable to report against. These patients had usually had extensive lupus before treatment was begun, or there had been severe ulceration of the mucous membrane of the nose, nasopharynx, or nasal cavities, and it is found to be much improved by treatment.

Could be mentioned that these results were not entirely due to light treatment, as ulcerated areas received preliminary treatment of the rays, and the nasal polypi and tumour cases received treatment either by operation or the application of strong acids and caustics.

I would like to take this opportunity of protesting against the unsuited treatment of lupus, especially of the dry forms, by the rays. I have seen a large number of cases in which several hundred applications of the rays have been made. The results in some cases have been satisfactory as regards the disappearance of the lupus, though the scar was an ugly one. This, however, is of small

[illegible]

[illegible]

[illegible]

[illegible]

LYMPHADENITIS, TUBERCULOUS. [illegible]

1. **Prospects apart from Radical Removal**: [illegible]

[illegible] Relapses [illegible] are not uncommon. But we may probably accept Wilkinson's figures as showing that about 24 per cent. are permanently cured. The majority either relapse and tuberculosis [illegible] for many years, the glands often becoming calcareous, or, more commonly, suppuration eventually takes place and an abscess bursts through the skin, often discharging for a long time and leaving an ugly scar. In children, the majority of the cases eventually break down; in adults, the glands are often long present in a quiescent state, and frequently show no tendency to change further.

Given the best possible conditions—fresh air, good food, etc.—the results would no doubt be better. Sea air, especially that of the east coast, has a great reputation in this particular complaint. But even under the best circumstances a considerable number of the cases ought to come to operation.

Tuberculin. The value of tuberculin is not yet definitely determined by statistics, but it often appears to help. Carmalt-Jones has published results of 130 cases treated at St. Mary's Hospital inoculation department. He describes 27 as cured, 21 as much better, 18 better, 8 not

[illegible]

Mortality of Operation. [illegible] Patients [illegible] 2 deaths in 161 operations. We may [illegible] that apart from the [illegible] anæsthesia deaths, [illegible] practically nil.

Stones may be [illegible], but it is very unusual [illegible] such structures as the [illegible] permanent trouble [illegible] any harm. Cutting the [illegible] [illegible].

End-results of Operation. It is [illegible] of permanent cure [illegible] of their methods.

Recurrence.—The number of local recurrences is [illegible] collectors of statistics as follows: Wadsworth, 30 per cent [illegible] 25 per cent out of 100 cases; Jacobs, 8·6 per cent out of 6[illegible] at the Mayo clinic, Mathes, 13·4 per cent out of 67 cases. Wadsworth's records are getting [illegible] and are probably [illegible]. The true recurrence rate, judging by what is [illegible] practice, is probably about 1 in 5 or 6, and it would be [illegible] complete clearance of glands were made in the last part [illegible] writers attach great importance to removing infected [illegible] carious teeth, as a considerable [illegible] in recurrence [illegible].

Recurrence Elsewhere.—Another inquiry must be made concerning the prospects of subsequent development of tuberculosis elsewhere

LYMPHADENOMA.

Medical Treatment [illegible]

Surgical Treatment is only admissible in the early stage when the [illegible] is localized to a group of superficial glands, as in the neck. [illegible] considerations this perhaps logical to have the primary [illegible] to prevent generalization. In some instances this has been [illegible] to delay the course of the disease. In a case under my care [illegible] was an interval of five years between operation and death.

Recently stress has been laid on the importance of removing the foci of entry, such as the tonsil or carious teeth (Yates and Bunting[6]). On the other hand, it is often impossible to remove all the glands involved when the parts are exposed, and in some instances recurrence and generalization occur rapidly after operation and after the removal of a gland for diagnosis: the later excess, however, is not necessarily due to operation, as it may have begun before the surgical procedure. It is possible that *x*-ray exposures soon after operation might be beneficial by acting on the inoperable glands. Although operation may be desirable to relieve pressure symptoms or to prevent deformity, its influence from a prognostic point of view is probably bad.

Prognosis in Individual Cases. The prospect of life varies according to the stage and site of the disease; when it is confined to a single group of glands, two, three, or even more years may elapse before death, provided pressure is not exerted on some important structure such as the trachea or bronchi.

In the late stage, when generalization has taken place, the end is nearer, but considerable variations are met with. Thus, a mediastinal growth may, by mechanical pressure, precipitate the end. Intra-thoracic and intra-abdominal lymphadenoma is more rapidly fatal than wide spread superficial glandular implication. This is incidentally shown by the figures given below in connection with the bearing of relapsing fever on the prognosis. Fever of one form or another almost always occurs in the course of the disease, and generally speaking its presence points to an advanced stage with generalization of the disease. The average duration of life after the onset of the relapsing type of fever is about seven and a half months (Batty Shaw[7]), but cases have been known to last more than a year. The cases which present the relapsing form of fever appear to run a more rapid course than others. In 27 cases of lymphadenoma with relapsing fever collected by McNalty,[8] the extremes of life from the onset of the glandular enlargement were five weeks and four years, and the average 12·7 months; or excluding 3 exceptional cases with durations of two and a half, three, and four years, 9·3 months. In 18 out of these 27 cases in which the superficial glands were enlarged, the average duration was 14·6 months, or excluding the 3 cases of exceptionally long duration, ten months. In 7 cases in which the internal glands only were affected, the duration was eight months.

Haemorrhages and a grave secondary anaemia show that the end is near. There seems some evidence that a relatively high polymorphonuclear count with a very considerable fall in the lymphocytes, a decided leucopenia, and a small number of platelets in the blood (Bunting[9]), indicate a late stage of the disease. Pruritus, which is rather rare, has appeared to me to be associated with a rapid course of the disease.[8]

Disappearance of glandular enlargement is not necessarily a good sign, for the disease may advance in the internal organs while the superficial lymphatic glands are disappearing. Further, although the

amount of growth left is small, the patient may pass into an extremely anæmic and cachectic condition and die. I have seen this after prolonged x-ray treatment. The appearance of complications, of which [illegible]losis is the most frequent, renders the prognosis very grave.

[illegible] [1]Longcope, *System of Medicine* (Osler and McCrae), 1915. [illegible] Yates and Bunting, *Jour. Amer. Med. Assoc.* 1917, lxviii, 747; [illegible] *Zeits. f. Heilk.* 1904, xxv, 269; [4]Karsner, *Arch. Int. Med.* Chicago, [illegible] 175; [5]McNalty, *Quart. Jour. Med.* Oxford, 1911-12, v, 76; [illegible] *Univ. Penn. Med. Bull.* Philad. 1906-7, xix, 282; [7]H. Batty [illegible] *Edin. Med. Jour.* 1901, N.S., x, 501; [8]Bunting, *Johns Hop. Hosp. Bull.* [illegible] 1911, xxii, 369; [9]Rolleston, *Practitioner*, 1911, lxxxvi, 505.

H. D. Rolleston.

LYMPHATIC FISTULA.—(*See* THORACIC DUCT, WOUNDS OF.)

MADURA DISEASE.—This disease produces much deformity, [illegible]ten results in the loss of a foot or hand. It is not a fatal affec[illegible] except rarely through secondary septic infection.

Leonard Rogers.

MALARIA.—Malaria is so widely distributed and so commonly [illegible]dent that in spite of a low case mortality it is responsible for a [illegible] large total mortality; not so great, however, as stated by some [illegible]rs who have assumed that a very large proportion of the deaths [illegible]ed as due to 'fever' in India are malarial, whereas investigations have shown that even in very malarious parts of Bengal not more [illegible] 20 to 25 per cent of 'fever' deaths are due to malaria, a large [illegible]rtion of which occur in children during the autumnal months [illegible] end of the monsoon. Epidemics of malaria, such as that follow[illegible] exceptionally heavy rain in the Punjab in 1908, cause a high [illegible]tality due to heavy infections and lack of adequate treatment.

The case mortality of malaria under efficient quinine treatment is [illegible] having been 2·9 per cent among 210 cases in Europeans in [illegible]tta, while Daniels records a mortality of 0·91 per cent in more [illegible] relapsing forms seen at the London docks. In Calcutta the [illegible] mortality was twice as high in the malignant as in the benign [illegible], while none of the few quartan cases died. The majority of [illegible] fatal cases were admitted unconscious and died within a few hours [illegible] cerebral malaria, the blood showing extremely numerous parasites. [illegible] unconsciousness has been produced by blocking of the cerebral [illegible]laries by the parasites, recovery is unusual, so it is of the utmost [illegible]rtance to recognize in good time the cases in which this is likely [illegible] occur. This can only be done by the microscope, which reveals [illegible] danger by showing extremely numerous parasites in the blood, [illegible] of the malignant tertian type. When many parasites are [illegible]d in every field of an oil-immersion lens the case is a dangerous [illegible] and especially so if the parasites are nearly as numerous as the [illegible]corpuscles, when the danger is great and imminent, as the ordinary [illegible]od of administering quinine by the mouth will fail to save the [illegible]nt's life. In such cases intravenous or subcutaneous injections [illegible]ly diluted soluble bihydrochloride of quinine are necessary, by

which means the mortality has been much reduced in the Panama Canal zone recently. The writer has seen deaths result from the refusal to adopt this treatment in cases in which he had found very numerous parasites present from one to three days before urgent symptoms appeared; while, on the other hand a grave case, suspected to be typhoid until the blood was examined, was saved by intravenous quinine. The rare intestinal malaria with choleraic symptoms is also very fatal if not detected by the microscope and adequately treated as in a case the writer rescued from the cholera ward by a timely blood examination.

Apart from the microscope the clinical symptoms are often a very fallacious guide in the prognosis of malaria, except when cerebral symptoms have already set in, when it is usually too late to save the patient. The height to which the paroxysm rises is of little importance, for temperatures of 106° or more, for a short time, most frequently occur in the relatively innocuous benign tertian form. Of much more importance is the persistence of the remittent type of fever without any fall to the normal line, indicating numerous broods of parasites, producing an approach towards a typhoid-like chart; and the higher the lower limit of the temperature curve, the more severe is the case as a rule, except in the terminal stages, when a low temperature may be seen. In benign tertian cases the failure of the temperature to reach the normal line between the paroxysms indicates an exceptionally severe case. The pulse is always rapid during fever in malaria, but if it is exceptionally high, such as 140 or over, and feeble, it is a bad sign.

Chronic Recurrent Malaria. Native patients often suffer from repeated attacks of malarial fever through neglect of quinine treatment, when further symptoms occur which affect the prognosis. Severe anæmia and debility, predisposing to dangerous intercurrent diseases such as pneumonia and phthisis, are the most important. Abortion, or premature delivery of an immature infant which soon succumbs, is a common sequel to chronic malaria, being largely responsible for the high infant mortality and low birth-rate in malarious countries. The size of the spleen is of little guide in the prognosis, as the largest are often seen in the mild quartan malaria, while the organ may be but little enlarged in the severe malignant tertian variety. A normal proportion of leucocytes is a favourable sign in spleen cases, as it indicates an amenable chronic malaria and not the deadly kala-azar. (*See also* BLACKWATER FEVER.)

Leonard Rogers.

MANIA.—(*See* MENTAL DISEASES.)

MEASLES.—The most important points to which attention must be paid in the prognosis of measles are: (1) *The age of the patient*; (2) *The presence of certain complications*; (3) *Certain special symptoms*; (4) *The social status of the patient*; and (5) *The virulence of the epidemic*.

Age.—It can with confidence be stated in general terms that [illegible]er the patient the worse the prognosis, but that only for [illegible] under two years of age is it really serious. The exact gravity [illegible] prognosis when considered from this point of view varies with [illegible]racter of the epidemic and the circumstances of the patient. [illegible]t figures bearing on the subject are those from the city of [illegible]n, where measles was a notifiable disease for the twenty years [illegible] 1902. During that period 40,374 cases were notified, and [illegible]re 1346 deaths. For all ages and for the whole period the [illegible] was thus 3·3 per cent. The following table shows the fatality [illegible]erent age-periods. From this it is seen that the fatality is [illegible]rable, highest in infants under one, and next high in those [illegible]n one and two. After that age it drops considerably, and [illegible] low at all other ages.

[illegible] possible that the Aberdeen notifications contained a consider-[illegible]nber of cases of rubella. As the latter disease is very rarely [illegible] inclusion in notifications of measles would cause the fatality [illegible]his disease to appear to be lower than it really is.

FATALITY ACCORDING TO AGE (ABERDEEN).

[illegible]	[illegible]	[illegible]	[illegible]
Under 1	13·9	9–10	0·6
1–2	10·0	10–11	0·2
2–3	3·4	11–12	0·0
3–4	1·6	12–13	0·0
4–5	0·9	13–14	1·2
5–6	0·7	14–15	0·0
6–7	0·5	15–25	0·9
7–8	0·5	25–60	0·6
8–9	0·4	60 and over	0·0

[illegible] only statistics available in which corrections for errors of diag-[illegible] have been made are those of various hospitals. But inasmuch [illegible] worst cases are, as a rule, sent to hospital, while the less serious [illegible]treated at home, the fatality of cases treated in hospitals is usually [illegible] The table on the next page shows the cases admitted into the [illegible]tals of the Metropolitan Asylums Board during the four years [illegible] to 1914, with the number of deaths and fatality per cent.

[illegible] figures in this table bear out the statement made above as to [illegible] diminution of the fatality with the increasing age of the patient. [illegible] makes no difference in the prognosis.

Complications.—*Lung Affections.*—By far the most formidable, [illegible]ll as the most frequent, complication is bronchopneumonia. It [illegible]nts for a large majority of the deaths from measles. During [illegible] years 1911 to 1914 there were 1988 cases of measles under

FATALITY ACCORDING TO AGE (METROPOLITAN ASYLUMS BOARD)

Under 1	1080	247	22·8
1–2	2728	582	21·3
2–3	2125	251	11·8
3–4	1874	133	7·0
4–5	1470	76	5·1
Under 5	9277	1289	13·8
5–10	2037	56	2·7
10–15	149	3	2·0
15–20	60	0	0·0
20 & over	105	2	1·9
Total	11,628	1350	11·6

treatment at the Eastern Hospital, Homerton, and in 309, or 15·5 per cent, bronchopneumonia supervened. Of the 309 cases, 220 or 71·1 per cent, were fatal. Besides these there were 18 fatal cases of bronchitis. The total number of measles deaths for the three years was 303; so that in 78·5 per cent of the fatal cases death was due to acute bronchitis or bronchopneumonia. These figures suffice to indicate the gravity of pulmonary complication.

Cancrum Oris and *Acute Tuberculosis* are extremely serious, but fortunately they are relatively uncommon. Chronic and latent tuberculous lesions are prone to be stirred into activity by an attack of measles.

Secondary Inflammation of the Fauces should be regarded with apprehension. Not infrequently it results in extensive ulceration and septicæmia.

Implication of the Larynx occurs in between 4 and 5 per cent of the cases. The prognostic significance depends on the period during which it arises. There is less cause for alarm when it occurs during the initial period, before the appearance of the rash, than when it sets in as the latter is fading, or during convalescence. The laryngeal symptoms of the initial period are usually due to simple laryngitis, and in many cases subside when the rash comes out. Late laryngeal symptoms betoken either diphtheria or laryngeal ulceration, both of which conditions are serious, but especially the former. Indeed, hardly a more formidable combination of acute infectious diseases is to be found than that of diphtheria and measles.

But even non-diphtheritic inflammation of the larynx is a very serious complication. During the four years 1911 to 1914 there were

of laryngitis or ulceration of the larynx at the Eastern d. Of these, 32 were fatal, or 37·2 per cent. In a consider- ber of the cases intubation or tracheotomy was necessary pneumonia, too, is not uncommon in the laryngeal cases. ulence of laryngeal complications varies in different years ses were distributed amongst the four years, as follows: 30 cases with 17 deaths; 1912, 28 with 6 deaths; 1913, 20 aths; 1914, 8 with 2 deaths.

Affections.—The eye is prone to become inflamed in measles. plication occurred in nearly 4 per cent of the cases at the Hospital. Usually the inflammation is limited to the con- but occasionally the cornea is involved, in which case an an opacity may result. But these sequelæ are rarely seen in which early and assiduous treatment has been applied. of ophthalmia is particularly dangerous—namely, that in only the conjunctiva, but also the eyelids are inflamed. usually brawny swelling, and the lids are with difficulty l. These are the cases in which loss of sight results some- en though every attempt is made to save the ear.

Media occurs in from 11 to 14 per cent of cases treated in al. The prognosis is much the same as in scarlet fever.

Special Symptoms.—If the respiration becomes hurried and and extremities cyanotic before the rash comes out, the pro- grave. When convulsions occur, recovery seldom takes place. pulmonary symptoms not clear up within two or three weeks onset (which is mostly while the rash is out), tuberculous should be suspected. Progressive wasting with pyrexia, with t diarrhœa, is also suggestive of the same disease. Frequent g and diarrhœa are ominous, especially if they come on early disease and are accompanied by a fall of temperature and other collapse.

The Social Status of the Patient.—It is a matter of common on that measles is much more fatal amongst the poor than to-do. Perhaps, indeed, in no other acute infectious disease, exception of whooping-cough, is this class-distinction more l. In Aberdeen it was found, during the twenty years already to, that the fatality varied inversely with the number of cupied by the family in which the cases occurred. Thus, in ed houses it was nearly 7 per cent; in two-roomed, 3; in omed, just under 2; and in four and five-roomed, less than 1. erage fatality for all houses was 2·4 per cent.

Virulence of the Epidemic.—The effect of this has also been by the Aberdeen figures. In that city the fatality from measles from 0 to 25 per cent in different years. *E. W. Goodall.*

MEDITERRANEAN OR MALTA FEVER.—(*See* TROPICAL FEVERS.)

MELANCHOLIA.—(*See* MENTAL DISEASES.)

MELANOTIC SARCOMA.—The prognosis in this dreaded form of malignant disease has been painted in tones as black as the characteristic nodules of the malady, a view which requires some modification.

Melanotic sarcoma, broadly speaking, arises either in the choroid coat of the eye, or in the skin. In the latter situation it originates either from a congenital pigmented mole, or in rare cases from punctured wounds, which presumably carry a group of the pigmented connective-tissue cells of the skin into a situation favourable to their proliferative activity.

The duration of life in melanotic sarcoma is usually about two to three years. The disease is generally painless until towards the end, but subcutaneous deposits of the disease, when ulcerated, become painful. The patient is usually able to go about and follow his occupation without any feeling of illness until a few months before death. Lymphatic œdema of the affected limb then begins to manifest itself if the disease has begun on one of the extremities, or the deposits in the internal organs—and especially in the liver, which may attain an enormous size—interfere by pressure with the activities of the vital organs, and cause serious effusions which are the usual proximate cause of death. On the whole, melanotic sarcoma is a very merciful form of malignant disease.

As stated in my Hunterian Lectures on melanotic growths, I have obtained strong microscopic evidence that the process of dissemination in malignant melanoma, just as in breast cancer, is primarily one of centrifugal lymphatic permeation. There is, it is true, strong evidence from the results of necropsies that in many cases the blood-vessels are the channels of spread in the later stages of dissemination. The crucial point to settle as determining the prospects of surgical interference in malignant melanoma is this: At what period is lymphatic dissemination supplemented or replaced by blood dissemination? When once viable fragments of the growth are launched into the blood-stream the surgeon's hand is paralyzed, and the patient must depend entirely on the natural forces, always inadequate, and frequently altogether absent, which tend to the destruction of the embolized fragments.

Fortunately it would appear that, as a general rule, blood invasion does not take place at an early stage. This is indicated prima facie by the comparatively long average duration of the disease, which has been estimated at three years; if malignant cells reach the blood in the early stage of the disease, the natural powers of resistance must inhibit their further development, or obviously the patient would succumb within a few months. In the second place, cases of death from intercurrent disease occur, in which lymphatic dissemination sufficiently widespread to be inoperable is seen, unaccompanied by evidence of blood dissemination. Lastly, most extensive lymphatic distribution of the disease may take place in the glands, the subcutaneous tissues, and upon the serous membranes, without any of the nodular visceral metastases which are the usual result of blood

In the museum of Guy's Hospital there is a specimen [illegible] very directly on this point. It is a kidney, itself entirely [illegible] so far as the naked eye can see, but embedded in a [illegible]anotic growth which is replacing the perinephric fat. It [illegible] that, as frequently happens in breast cancer, the [illegible] growth originated from malignant infection of the lumbar [illegible] If this is the case, it is evident that widespread lymphatic [illegible] may occur in melanotic sarcoma, without obvious [illegible] the kidneys of embolic blood invasion.

[illegible]p. pathology indicates that if the operation for melanotic [illegible] rightly planned, its prospects should not be so hopeless [illegible]ally assumed.

[illegible]ples upon which the excision of a malignant melanoma [illegible] carried out are, in my opinion, as follows: A circular incision [illegible] made through the skin round the tumour, at what is judged [illegible] standards to be a safe and practicable distance. The [illegible]tinated as a rule about an inch from the edge of the tumour, [illegible] just deep enough to expose the subcutaneous fat. If necessary [illegible] radial linear incisions extending from the circular one should [illegible] on opposite sides of the tumour in order to facilitate the [illegible] of the skin flaps, which forms the next step. The skin, [illegible] attached layer of subcutaneous fat, is now to be separated [illegible] deeper structures for about two inches in all directions round [illegible]cision. At the extreme base of the elevated skin flaps a ring [illegible]down to the muscles surrounds and isolates the area of deep [illegible] and overlying deeper subcutaneous fat to be removed. The [illegible] is next to be dissected up centripetally from the muscles [illegible] to a line which corresponds with that of the circular skin [illegible] Finally, the whole mass with the growth at its centre is [illegible] by scooping out with a knife a circular area of the muscle [illegible]ly subjacent to the growth. The edges of the wound are [illegible]ht together as convenience dictates.

[illegible] in 1903, Eve[1] said: "The removal of the nearest chain of [illegible] glands, whether palpably enlarged or not, should never be [illegible]er it may be taken as a matter of certainty that in a great [illegible] cases they are infected." In the same paper, Eve enforces [illegible] by recording a case of melanoma of the palm in which, [illegible] the axillary glands were not palpably enlarged, they were [illegible] even to the naked eye. Yet Acton[2], writing in 1905, found [illegible] every case of which the records were available, that the [illegible]rowth was removed and the lymphatic glands were left.

[illegible] the imperative need for removal of the lymphatic glands [illegible] of the first operation, it must be remarked that in cases [illegible]ow palpable enlargement of these glands, simple excision [illegible]ds is likely to be quite useless. I have shown that permeation [illegible]mphatic plexus of the deep fascia soon takes place around the [illegible] glands, just as it occurs round the primary tumour. The [illegible] of the glands must therefore be carried out on exactly the

same principles as the excision of the primary tumour—that is, a large circular area of the surrounding deep fascia must be exposed, dissected up from its circumference towards the infected glands, and removed in one piece with them. In late cases it may even be right to remove an area of skin over the infected glands, but such cases are probably inoperable. Lastly—and this is most important—any apparently healthy set of glands above those obviously enlarged should be completely removed.

The case which follows illustrates the successful application of these principles.

Miss C—, age 40, was sent to me by Dr. Barstow of Stamford on October 21, 1909. In September, 1907, Dr. Morelon Parker removed an ulcerated papilloma which had been present on the dorsum of the left wrist for two or four years. In September, 1908, some small lumps were removed just above the epitrochlear gland. These lumps were subcutaneous, and were not glandular. A week or two later, a small dark nodule appeared just below the incision. It was removed under local anæsthesia, and was reported by the Clinical Research Association as a malignant melanoma. Subsequently the patient suffered much pain in the bicipital region, thought to be due to an involvement of nerves in the scar. On examination, I found a vague induration running up the brachial vessels about the middle of the upper arm, midway between the axilla and the scar of the second operation, and it appeared probable that the growth was recurrent in this situation. Moreover, a large gland, nearly as big as a chestnut, could be felt in the axilla. I therefore advised a thorough operation, which should include removal of the supraclavicular glands, clearing of the axilla, and excision of the deep fascia extending from the axilla almost to the elbow. The patient consented to undergo the operation, and was admitted to the Bolingbroke Hospital. A semilunar flap of skin, involving most of the inner aspect of the arm, was turned backwards, and the deep fascia was widely removed, with exposure of the brachial vessels and accompanying nerves. The axilla was next opened by a prolongation into its forms of the first incision, and was completely cleared of its fat and glands, which were removed in continuity with the deep fascia of the inner side of the arm. The supraclavicular triangle was now cleared of its fat and glands through a separate incision. The patient made a good recovery from the operation.

About a year later, a recurrent nodule appeared over the lower part of the biceps at the back of the arm. It was excised on December 15, 1909, and on section was a typical sarcoma, unpigmented and degenerate at the centre. (It is well known that unpigmented metastases are not rare in melanotic sarcoma.) Since this time the patient has remained well, and the neuralgic pains from which she suffered in the arm have greatly improved, especially since a visit to Sidmouth, where she had hot sea-bathing treatment.

The absence of any sign of recurrence up to the present time, a period of over four years, encourages me to hope that in this case a permanent cure has been obtained.

In this connection I may repeat what I said in my Hunterian Lectures in 1907: "The methods still employed in dealing with melanotic growths of the skin are precisely those which years ago gave such deplorably bad results in the treatment of carcinoma of the breast. Formerly the tumour, with a small circumferential area of skin, was cut out from the breast, and the axillary glands were removed, if at all, only when palpably enlarged. Even when the glands were

the surrounding zone of permeated lymphatics in the breast, p fascia, and in the muscles, was left intact to reproduce the Nowadays, the improved operation for breast cancer pro- nged or permanent immunity in about 50 per cent of cases. n the evidence I have laid before you, I venture to predict application of more thorough and scientific methods to ry of cutaneous melanomata will produce a corresponding, haps a smaller, improvement in the results of operation that the case I have recorded is the beginning of the fulfilment tion then made, though, owing to the fortunate rarity of the evidence can only accumulate very slowly.

ne other opportunity has occurred to me of applying the which I advocate in the treatment of melanotic sarcoma.

s that of a middle aged man lying in the inoperable cancer Middlesex Hospital, with a small, non pigmented, pedunculated foot, and a mass of confluent and adherent melanotic inguinal I had no sanguine expectation that he would escape local recur r the removal of these glands, but since only slightly enlarged be felt above Poupart's ligament, I thought it worth while to d treatment. After removing the primary growth, I excised d glands with a large area of fascia. I then divided Poupart's d removed the glands along the external iliac vessels nearly as bifurcation of the aorta. But even the highest glands which h already showed signs of early malignant deposit, and it was to carry out the principle which I believe to be so important, al of the apparently unaffected set of glands above those I was not surprised that this patient returned a few months inoperable recurrence in the region of Poupart's ligament

m up, the prognosis in melanotic sarcoma is not nearly so bad as been represented, provided that the disease is recognized ed that it is operated upon on the lines indicated by the patho- evidence of its mode of spread.

REFERENCES.—[1]Eve, "A Lecture on Melanoma," *Practitioner*, 1903, Feb.; [2]W. Acton, *Middlesex Hosp. Jour.* 1905.

W. Sampson Handley.

MENINGITIS.

Meningococcal Meningitis (sporadic).—In this form, where the can generally be clinched by the demonstration in the cere- al fluid of the characteristic diplococcus, the prognosis as to relatively more favourable than in other forms of meningitis. n the 94 cases collected by Lee and Bachow, 50 per cent of the s admitted to hospital survived; but, of these, only some cent recovered completely, the remainder being left with hydro- s, blindness, or varying degrees of mental deficiency, sometimes ing to idiocy.

results of intrathecal injection of antimeningococcal serum s striking than in the epidemic variety of the disease. Never- s, lumbar puncture—by relieving the intracranial pressure— the administration of the above-mentioned serum, when available,

will sometimes turn the balance and may save a patient who would otherwise die.

The prognosis as to the future mental condition of those patients who survive should be guarded. Even after an apparently complete recovery from all the meningeal symptoms, it may be found that a child's subsequent mental development is retarded or delayed. During a considerable proportion of the cases which survive develop hydrocephalus, probably due to adhesions established in the foramina of Magendie or in the other foramina in the neighbourhood of the fourth ventricle, thereby preventing the downward flow of fluid from the ventricles into the spinal theca. Other patients again become permanently blind or deaf from inflammatory changes in the optic or auditory nerves.

Meningococcal Meningitis (epidemic).—The prognosis in cases of this type, untreated by serum, is extremely bad. According to the statistics of Flexner, the mortality is usually from 80 to 90 per cent. and never less than 70 per cent. Since the introduction of serum treatment by intrathecal injection, however, the gross mortality in cases thus treated has fallen to a remarkable extent. Thus, out of 1295 serum-treated cases collected by Flexner, 893 recovered and 402 died, a mortality of 31 per cent. The earlier in the disease the specific treatment is begun, the better are the prospects, as shown by the following table of 1211 cases:

MORTALITY ACCORDING TO TIME OF SERUM TREATMENT.

Within first three days	-	199	18
Fourth to seventh day	-	346	27
Later than seventh day	-	666	36

The mortality amongst infants under two years of age is usually very high, rarely being less than 90 per cent, according to Flexner. But of 125 serum-treated infants under one year old, 63 recovered and 62 died; of 21 infants injected within the first seven days, 17 recovered and only 4 died, a mortality of less than 20 per cent.

Whereas recovery is a gradual process, lasting about four weeks, in the small proportion of epidemic cases which spontaneously survive, in serum-treated cases, on the other hand, recovery by crisis is not uncommon, and the duration of the disease averages only about eleven days.

Pneumococcal Meningitis, etc.—Pneumococcal meningitis may occur as a primary malady, or it may be secondary to pneumococcal infection of other parts of the body, especially after empyema or otitis media. Untreated cases are practically always fatal. Lumbar

[illegible] relieve symptoms, and may in some cases [illegible] the moment of recovery. The [illegible] *Meningitis*. I myself observed a case of [illegible] man aged twenty-one, in whom there was a [illegible] infection, [illegible] arthritis developed in the [illegible] Three weeks later—i.e., six weeks after the original [illegible] he developed all the signs of meningitis. The cerebrospinal [illegible] turbid, with a large deposit of pus. An [illegible] injected intrathecally, and, on three subsequent occasions within [illegible] meningococcal serum. After a temporary relapse, the [illegible] completely made a complete recovery in about three months.

Tuberculous Meningitis.—Here the prognosis is always grave. [illegible] diagnosis has been established, by the presence of headache, [illegible] convulsions, stupor, by the occurrence of a pleocytosis of [illegible] cerebrospinal fluid, and, most conclusive of all, by the discovery [illegible] tubercle bacilli in the fluid, we must be very guarded in our prognosis. [illegible] prospects of recovery depend upon various factors. If the disease [illegible] confined to a small part of the meninges, and if there be no extension [illegible] the substance of the brain, there is still a possibility of recovery. [illegible] however, the meningitis be widespread, and accompanied by [illegible] signs of focal brain affection, the hope of recovery is almost [illegible] The occurrence of glycosuria is of bad omen; when present, it [illegible] presages death within two or three days.

[illegible] making our prognosis in any individual case of meningitis, from [illegible] cause, we have to bear in mind that the immediate causes [illegible] are two in number: first, mechanical distention of the cerebral [illegible] (acute hydrocephalus); and second, toxæmia resulting [illegible] products of the infective organism. The toxæmic element, [illegible] lately, is not at present directly amenable to treatment; but [illegible] if it be not too intense, we may, by relieving the mechanical [illegible] sometimes save the patient's life. This is best done by [illegible] repeated lumbar punctures. After withdrawing cerebro-[illegible] fluid until the intrathecal pressure falls to normal, we generally [illegible] a distinct improvement in the clinical symptoms, so that the [illegible] stupor clears up, temporarily at least, and the headache and [illegible] are relieved. By repeated lumbar punctures at intervals [illegible] two days, life may thus be prolonged, and cure may even [illegible] I may quote a case of my own, a young man of twenty-two, [illegible] headache, vomiting, stupor, head retraction, absent knee jerks, [illegible] whom a patch of chronic lupus on one leg gave clinical evidence [illegible] tuberculous infection, and in whom the cerebrospinal fluid con-[illegible] fewer than 3467 lymphocytes per c.mm. Repeated lumbar [illegible] have in all, about once a week, produced not only disappear-[illegible] all the clinical symptoms, but the pleocytosis of the cerebro-[illegible] fluid fell successively to 827, 787, 36, and 16 cells per c.mm., [illegible] patient made a perfect recovery. Such cases, it must be [illegible], are the exception, but the fact that they do occur must

[illegible] the view hitherto almost universally held that the [illegible] certainly be fatal since the diagnosis of tuberculous meningitis is established.

Meningism is a condition in which the patient, usually a child rather during the course of some pyrexial fever or by any febrile condition, develops many of the cardinal phenomena of meningitis, but where the cerebrospinal fluid withdrawn by lumbar puncture is [illegible] neither excess of cells nor organisms. It is most frequent in children with a tuberculous diathesis and most often raises the suspicion of tuberculous meningitis. The symptoms rapidly clear up after the lumbar puncture.

Pyrexia, Stupor.

MENTAL DISEASES. Prognosis in mental diseases is affected not only by the nature and course of the particular malady, but also largely by the special anatomical construction and physiological functions of the brain. A correct prognosis is easy in some forms of disease, for instance, in many forms of skin disease. But in dealing with an organ such as the brain, the most important in the body, in its constitution and functions, the most highly integrated, the most complex, and the most sensitive to the effects of every environment outside the body, and to everything that takes place in it, it would be unreasonable to expect a very definite prognosis in most cases when it becomes diseased or disordered. Especially when its highest function of mind is disturbed, the difficulty of saying whether it will again resume its normal condition is often extreme. In addition to physical conditions of disorder, we are face to face with an entirely different set of conditions, viz., states of consciousness, intelligence, emotion, and passion. Disturbance of each of these may not only be a result of brain disease, but they may be its causes, and they may also act as means of cure. Mental diseases are unquestionably the most difficult department of medicine. The higher forms of the brain cell, being the vehicle of mind, are Nature's last and greatest effort in the evolutionary process which has been going on during the past [illegible] years of [illegible]. The full knowledge, treatment, and cure of these will be the highest achievements of medicine. Every such cell carries, in its molecular structure, and in its biochemical mode of action, the organic memories of its ancestral cells, and with these memories it becomes subject to ancestral reversions and weaknesses. How subtle and imponderable must be the changes which cause the mild emotional depression perhaps felt in the morning and gone within an hour! Yet that depression in a more marked form may constitute a mental disease. The human brain is a cosmos in which are represented the working and the condition of every other organ in the body. There are few diseases to which the mind is subject where some organ or function of the body is not also disturbed, and there are many cases where, as a result of mental disease, we have also peripheral bodily disturbances. There are, however, some cases of mental disease where we cannot, by any means at present at our disposal, discover

[illegible] symptom whatever, the mind alone seeming to be affected [illegible] the prognosis seems to depend on mental means of [illegible] [illegible] in such cases must depend on reactions to mental [illegible] but it may be said generally that prognosis depends chiefly [illegible] reactions to environment, diet, and medicine. If these [illegible] favourable and there is no organic brain disease the [illegible] generally good. The subjective state of the patient must [illegible] taken into account, and especially his feelings of optimism [illegible] that he will overcome the disease, and his power of will to [illegible] it. Personal equations of all sorts come in both in [illegible] the doctor and the nurses, as well as the patient himself [illegible] and prognosis.

[illegible] in mental disease must depend chiefly on the twelve [illegible] considerations, namely:

1. The causes of the disease.
2. Its form and symptoms.
3. Its previous duration.
4. The brain heredity of the patient.
5. The possibility of response and reaction of mental and bodily [illegible] to suitable treatment, especially to the restoration of sleep.
6. The sequence of the mental and bodily changes that have taken [illegible] during the attack.
7. The period of life of the patient.
8. The existence or not of signs of organic disease in the brain cells.
9. The existence or not of certain abnormal bodily conformations [illegible] stigmata.
10. The tendency or not that may exist to relapse and recurrence [illegible] symptoms.
11. The completeness or incompleteness of the improvement in the [illegible] under treatment.
12. The temperament and race of the patient.

It could hardly be said that in almost every case both the mental [illegible] bodily symptoms present at the time, and that have existed [illegible] the attack, must be taken into account in any attempt to [illegible] the course and duration of unsoundness of mind. In one [illegible] the mental symptoms will give better indications for prognosis, [illegible] in another the bodily symptoms, or the absence of them, will [illegible] to be relied on.

The really scientific study of mental diseases only began in the end [illegible] eighteenth, and the first part of the nineteenth, centuries. The [illegible] of the brain and its minute structure were only able to [illegible] scientifically studied well into the nineteenth century, and without [illegible] knowledge gained by this study a scientific psychiatry could not [illegible] attained. The classification of mental diseases and defects [illegible] first founded on mental symptoms alone. It consisted of four [illegible] namely: mania, or states of mental excitation; melancholia, [illegible] states of emotional depression; dementia, or conditions [illegible] treatment mental enfeeblement coming on in a brain that had

[illegible] been normal; and idiocy, or congenital forms of mental weakness. During the latter part of the nineteenth century an enormous number of varieties of mental disease have been segregated, the foundation in different cases being etiological, pathological, and psychological. Some of these varieties, like general paralysis, must be permanent. Many of them are obviously transitory and experimental. Prognosis must depend to a large extent on a true classification, where that is possible, and in the present article I shall adopt the varieties which seem to me to have a scientific and practical basis.

Early in the scientific study of mental diseases attempts were made in this country, on the Continent, and in America, to draw up statistical tables showing the number of recoveries, the number of deaths, the liability to relapse, and the duration of the attacks, but in all these insanity was regarded as a whole, and its forms and varieties were not taken account of. The science of medical statistics was then in its infancy, and the registers of the various existing mental hospitals were very imperfectly kept, while there were no available facts to be obtained from records of private practice. Esquirol in France, Jacobi in Germany, and especially Thurnam in England were the pioneers in the statistical department of prognosis in mental diseases. Farr helped greatly by pointing out the errors of previous writers and in laying the foundation of general medical statistics on scientific principles. The figures and the general results of these authorities need not be discussed in detail in this article, as the chief aim of this work is not statistical but clinical, and to help the practitioner of medicine. Thurnam sums up the general results of the treatment of insanity in institutions in his time, that is, about 1845, in this way: "A proportion of much less than 40 per cent of recoveries on the admissions is, under ordinary circumstances, to be regarded as a low proportion, and one much exceeding 45 per cent is a high proportion." He says, in regard to the mortality rate among the mentally afflicted, "a mortality that exceeds 9 or 10 per cent is decidedly unfavourable," and one which is less than 7 per cent is "highly favourable," in asylums where all classes are treated. In regard to pauper asylums, a mortality which exceeds 12 or 13 per cent is "a very unfavourable one," and one which is much less than 10 per cent is "highly favourable." Since that time the rate of mortality has remained nearly stationary, in spite of the fact that far more cases of senile breakdown and organic brain disease with resulting mental symptoms are now certified as insane. My personal experience of the recovery rate in 11,346 patients treated by me in the Royal Edinburgh Asylum during the thirty years 1874–1903, was that 39·4 per cent of them recovered. They included every variety of mental disease and defect which can be certified under the Scottish Lunacy Laws as unsoundness of mind or idiocy, but the number of cases of idiocy or congenital imbecility was comparatively small. I shall have in the course of this article to refer to the recovery rate in the various forms of mental disease which have been under my care in two mental hospitals and

[illegible]ate practice. The figures from the Royal Edinburgh [illegible] this advantage over those of county asylums and the [illegible]spitals of England, that they comprise the whole popula[illegible] are not confined to the rate-paid class as in the county borough [illegible] asylums, or the class in a better social position who can [illegible] pay for their maintenance as in the registered hospitals. [illegible] have this advantage, that they include the period (fifty [illegible] when the number and variety of persons counted as techni[illegible] and certified as such for institutions, were more restricted [illegible] the older times, and also the more recent years, when undue [illegible] extension has been given to the meaning of the term 'insanity.' [illegible] ago, before the Government grant was given towards the [illegible]tenance of every pauper patient, it was not so common as it is now to send to mental hospitals patients who suffered from various forms of senile decay, paralysis, and other incurable brain diseases. This is now done for two reasons: first, the great convenience and the [illegible]nefit to such helpless persons of being properly treated in the [illegible] wards of county asylums; second, the change of opinion that [illegible]ken place in regard to its being a discredit, if not a disgrace, to [illegible] relation in a mental hospital. The general effect of this change [illegible]nion and practice has been to reduce the percentage of recoveries [illegible]tish institutions. There has been, however, another tendency in the opposite direction, namely, to send cases at an earlier period of [illegible] disease, and to send more transitory and alcoholic cases, both of whom are apt to recover soon. In considering the statistics of institutions and of certified patients, this fact must be kept in mind, that mental disease in all civilized countries is not looked at and defined through the clinical symptoms present and from a scientific point of view, but largely through the provisions of the Lunacy Statutes. In this respect mental disease differs from all other diseases.

An important series of tables are given in the Reports of the Scot[illegible] Board of Lunacy for 1898 and 1913 (the 40th and 55th Reports), [illegible]ing the 'progressive history' of 3858 patients for fifteen years [illegible] admission into mental hospitals. These throw a valuable but [illegible] complete light on the prognosis of mental diseases, in regard to [illegible]ry and mortality. Of the patients of all classes, ages, and forms [illegible]ntal disease, admitted into Scottish asylums in 1868 and 1898, [illegible]ef results in the fifteen years are as follows: There were 2252 [illegible]ries,' or 58·6 per cent of the whole. But those included [illegible]ted recoveries in many of the patients. In fact, there were 1230 [illegible]dmissions to the institutions, most of which resulted from relapses [illegible]mental disease, and some had such relapses several times. Some [illegible] re-admissions were, no doubt, of the 781 who had left the [illegible]stitution not recovered. On the hypothesis that one-fourth of the 'recoveries' had been those of relapsed cases or of the previously discharged non-recovered, it would show a recovery rate of 43 per cent. The deaths during the fifteen years amounted to 1361, or 35 per cent of the total admissions.

One of the most striking and instructive facts about these tables is this, that it was in the first two years after admission that the greater number of the recoveries, the relapses, and the deaths took place. In fact, the general results of the mental attacks showed themselves in that time. Seventy per cent of the recoveries occurred then, 60 per cent of the re-admissions, and 45 per cent of the deaths.

Unfortunately these tables do not show how many of the recoveries relapsed into insanity. If the returns had shown how many of those who recovered had relapsed, and how many times, their value would have been enormously increased. If the heading after the first column had been "Relapsed after Recovery," instead of "Re-admitted," this result would have been obtained.

At the end of the fifteen years there were 694 patients of the 3858, or 17·9 per cent, left uncured in the institutions. An enormous "movement of the population" takes place, in fact, among the insane as compared with the general population, as might have been expected.

In addition to the twelve general considerations which I have mentioned, there are many particular symptoms and indications which apply in all cases of mental disease in forming a prognosis, some of which I shall describe. Most of them are of importance in determining this particularly difficult point.

We ask in every case of mental disease, when trying to solve the question of the chances of recovery, How did the disease come on? Had it the characters of a sudden brain explosion, a cloud coming into a clear sky, or was it a gradual evolution of mental symptoms beginning with slight psychical changes and evolving gradually from these into a more acute and marked disease? In making inquiries to determine this important point, we have to go into the normal psychology and mental habit of the man or woman. For instance, we have to inquire into the ordinary strength and the indications of the social instinct. This differs widely in different individuals: but if we find that the patient became, at a certain period, considerably anterior to the mental attack, less inclined to mix with his fellows in social intercourse, to be more self-contained, more reticent, more secluded in his habits, and that this gradually went on to an active dislike of social intercourse, this becoming a real pain to the man; if this went on further to a morbid suspicion of others, a misinterpretation of their conduct in regard to him, passing into organized and fixed insane delusion, leading perhaps to assaults or homicidal attacks on others—this whole sequence of changes in the social instinct, if it took years to accomplish, would lead to an extremely bad prognosis of the case, while if somewhat the same symptoms were rapid in their course and sequence, say within a few months from their beginning to their full mental development, they might not mean anything like so grave an outlook for recovery.

Taking another form of mental disease, namely, that characterized chiefly by maniacal excitement with emotional elevation, the outlook in such a case differs greatly according to the innate and original quali-

tus of the brain that suffers from it. If we have a case, let us say, with a bad mental or neurotic heredity, where during childhood there have been convulsions, night terrors, or other such signs of brain ity, and if we have, during the developmental period of the endencies to delirium or even short attacks of maniacal or l conditions or periods of lethargy and stupidity, the prognosis such a case need not be unfavourable, at all events until after five or thirty years of age.

arious epochs of life also, and their effects on the mental con- f men and women, cannot be left out of account in the prognosis f the diseases to which they are specially subject, but especially diseases are mental in character. Each epoch of life has its ve physiological and psychological characteristics. The pre- dynamical and trophic activities are different at different times The child period, when growth in bulk is the characteristic, sex, child-bearing, the decadence of power which marks cteric and old age, have all to be taken into consideration nosis. In almost any case of insanity we cannot dissociate the from the abnormal psychology one influences the other. The is often an evolution of the natural temperament. The same s occurring at twenty-five and at seventy may mean a quite prognosis in the two cases.

time element in all forms of mental disease is of the greatest tance; in fact, in many cases this determines the prognosis. be laid down as an almost universal axiom that the chances ery diminish after the first year in the ratio of the duration of k, except where the epochs of life of which I have been speaking come in. We never give up hope of recovery in such cases until rticular epoch during which the attack has begun is passed. nt mental symptoms also affect the time limit differently. For e, I was in the habit of laying down to my students this dictum: give up hope in the case of melancholia while the depression lasts." It is different with conditions of exaltation. If they for over a year or two, and take on the signs of chronic mania, nosis is bad; if symptoms of general enfeeblement of mind n and last, say, for a year, the prognosis is almost hopeless. me rule applies to conditions where we have regular periodic es of the mental symptoms. If such persist for over a year they certainly make the prognosis bad. The typical instance recurring and alternating insanity is *folie circulaire*, and that is regarded as almost incurable. There are certain gross diseases brain, such as certain forms of apoplexy and paralysis, which r first onset are apt to be accompanied by mental symptoms; f these are recovered from; at all events, the patients partially m mind, in such a way that they can no longer be regarded hnically insane; but if such mental symptoms persist more let us say, six months, the prognosis is unfavourable. The same pplies to many of the cases of insanity caused by alcohol,

opium, and other toxins. If the mind is disordered as the result of an acute toxin such as influenza, we expect it to be very short in duration.

Acuteness of symptoms is very apt to be considered by relatives to be a bad sign in regard to the prospects of recovery. That is not so. I always like an acute case of any kind where organic brain disease does not exist, and tell the relations that it is one of the best signs that the case will recover quickly and perfectly. For instance, one of the acutest of all forms of insanity is that caused by child-birth, and yet none recovers so certainly, quickly, and completely. There is, of course, a greater risk of death in the acute cases, and this should always be explained to relations. Eight per cent of all cases of acute mania [illegible] of the disease, and the mortality in puerperal insanity is even greater.

Facial Expression in Prognosis. The mental expression of the face and eyes in most cases of mental disease should be carefully observed. It is changed for the worse, and in some of the more acute varieties it is so changed that the man is almost unrecognizable by his friends. The only exceptions to this are in the case of persons who are by temperament and natural disposition, slow, stupid, and lethargic. I have seen many such who, during a mild attack of mental exaltation, were brighter and better looking than ever they were in their lives. There are only two facial disturbances of a decided kind that I think are unfavourable in prognosis. One is the heavy wiped-out expression of the face and eyes in the young man, and particularly in the young woman, who, towards the end of an attack of adolescent insanity, has passed, or is passing, into dementia. The other is the cunning, suspicious expression of the patient who suffers from paranoia of the persecutory type. All the ordinary disturbances of expression but these, however extreme they are, may be recovered from, and the patient resume his normal appearance.

The muscular expression of the emotions is not sufficiently realized in mental practice. There are fifty mind and eye muscles, not including all those of speech, the action of which makes all the difference in their mental expressions between one man and another. They are extremely small in size, but they are innervated to an enormous degree. Their motor nerves together are as bulky as those of the arm muscles, which weigh a hundred times as much. It is only when these mind-muscles of expression and eye show a certain disturbed mode of action which lasts for a long time, that such changes indicate a bad prognosis. Commonly they change quickly from good to bad expressions, and vice versa.

Causation and Prognosis.—The cause or causes of a mental attack have often much relation to the prognosis in the case. The causes which may determine an attack of mental disease are almost innumerable, and I cannot in this article refer to all of them. Commonly, when the history of a case is gone into, one finds that there existed more than one cause of the attack. There is often a predisposing, an exciting, and a proximate cause. For instance, a man may have a bad

[illegible]ality as a predisposing cause, may have taken alcohol to [illegible] an exciting cause, and had a fall on the head as the proximate [illegible] attack. Then in some cases there are even more than one [illegible]. I shall further on refer to heredity, which is the chief [illegible] common of all the predisposing causes. There is a strong [illegible]ving to find a cause for such a tragic event in life as an [illegible] of mental disease. Relatives will press their doctor on this [illegible] unduly, and if a cause can be assigned there is very often [illegible] relief and a more hopeful feeling as to the chances of recovery. [illegible] this remark: "I feel happier now I know the cause of [illegible]." The relations of our patients are exceedingly apt to [illegible] which by no possibility can be the real ones. The causes [illegible] mother will assign for idiocy in her child may be almost gro[illegible] their unreality. To account for a mental attack, relations [illegible]ys seek a mental or a moral cause. In reality we know [illegible] about one-fourth of all the cases of mental disease are due [illegible]tal causes, the other three-fourths resulting from bodily causes. [illegible] over the tables of the causes of the diseases which are usually [illegible] to the annual reports of our large mental hospitals does not help us very much. Many of the terms are too general to be [illegible]entific or prognostic use.

[illegible] be assumed generally that a cause, or what may be reasonably [illegible] to be a cause, of a mental attack, will be less likely to produce [illegible]rable brain malady if it is removable. Taking such causes as [illegible] affecting the higher brain cells, most of them either exhaust [illegible]tion on the brain quickly, or an immunity is set up, or they can [illegible] or less counteracted by suitable treatment. I take as examples, [illegible] mental disease caused by or following the action of the influenza [illegible] or syphilis or alcohol. These together cover a very considerable [illegible] the era of mental disturbances. Then there are causes which [illegible] their nature transitory, such as child-birth, many forms of bodily [illegible] and exhaustion, surgical operations, etc. In regard to the [illegible] and moral causes of psychical disease, many of them soon [illegible] their deleterious action, or can be counteracted by changes [illegible]umstances and environment: of such are overwork, some forms [illegible]estic worries, love affairs, and mental shocks. On the other [illegible] there are causes that are almost necessarily irremovable, which [illegible]re lead to a bad prognosis, such things, for instance, as traumatic [illegible] to the head, senility, alcoholic excess so long-continued that [illegible]ame structure of the cells or vessels are changed, gross cerebral [illegible], epilepsy, etc. The mental symptoms may not be the main [illegible]nal element in the case. They may be so secondary to bodily [illegible] that the prognosis may depend almost entirely on the nature [illegible] bodily causes. I would take as an example cases dependent [illegible]rt or uterine disease, on cancer, on diabetes, or on pernicious [illegible]. Finally, the innate vulnerability and power of resistance [illegible] have to be taken into account when estimating progn[illegible] [illegible] to causation. One brain may be upset by a cause which in

another would produce no serious result at all. The unstable and vulnerable brain may, however, throw off bad effects far more readily and quickly than the more stable brain. Our modern methods of examination have enabled us to discover changes in the spinal fluid and blood and micro-organisms which are very valuable in regard to the prognosis in some cases.

Response to Treatment. Every medical man is influenced in his prognosis by the effects of his treatment, using treatment in its larger sense of environment, nursing, and diet, and not confining it to drug treatment alone. If a patient, for instance, falls into depression of mind on account of unfavourable or local circumstances, and when he is sent away for a change at once begins to brighten and have his attention taken up with his new surroundings, it is necessarily a favourable sign in prognosis; or if, in any case, we have to do with thinness and general want of nutrition in a patient suffering from any form of mental disturbance, and our efforts to increase his weight by diet or drugs or change of air are successful, we think better of his chances of recovery. I have sometimes watched with so much anxiety the putting on of the first pound or two of weight in a patient whom I was treating, that my whole outlook became more optimistic when that took place.

Insomnia, so very common a symptom in most cases of mental disease, both as preliminary to and during the disease, gives us the greatest anxiety in regard to the effects of treatment. It is so very intractable, in some cases, that we feel the patient cannot recover his mental balance until it is subdued. Nothing is more exhaustive to the higher mental functions of the brain than prolonged insomnia. If by drugs, by change of air, by medical treatment, we find that the normal periodicity in the occurrence of sleep is restored, we feel that the patient will almost certainly recover in due time. Volumes have been written as to what sleep is, and as to the best methods of restoring it when insomnia is present, but we all feel that as yet neither of these problems has passed into the region of scientific certainty. We do surely know that sleep is the greatest and most important of all the examples of periodicity in the physiological and mental life of a human being. We also know that it is Nature's most important method of resting the higher functions of the brain and of restoring to a proper state of nutrition the brain cells. Everyone who has thought about the subject realizes that the physiological unconsciousness of sleep is quite as mysterious as the occurrence of any mental disease whatever. Dreaming is the nearest physiological analogy to insanity. I believe that when we discover the secret of sleep it will lead to the discovery of the prevention of much mental disease.

Mental Hospital. The response, favourable or otherwise, to the removal of a patient to a mental hospital undoubtedly affects prognosis in his case. Unfortunately, the ideas of many of the public regarding mental hospitals, and the feelings of repulsion and distress which these ideas have produced, in some cases tend to counteract the good effects

...d, discipline, régime, and medical treatment which are ...constitutions. Happily such wrong ideas are now undergoing ...change, and a great many patients are willing to place them... treatment voluntarily in mental hospitals. This is the ...tory method of all in the cases where it is suitable. Un... the majority of cases of mental disease do not recognize ... and therefore resent such treatment as being unjustifiable. ...patient shows a marked betterment during his first month's ...in the hospital, it improves the prognosis in the case very. Before going to such a hospital, the doctor has commonly to ...lihood of an improved prognosis if sent there his chief ...that course being adopted, and undoubtedly in the larger ...cases such a prognosis is justified by the results. Unfor... at present, the risk of danger to himself or others is rather ...an element for the sending of patients to mental hospitals. ...the great reason should be the improved chances of recovery ...impossibility among the poor of securing proper treatment ...

...are a certain number of cases where the prognosis is distinctly ...by removing patients from mental hospitals to other environ... This occurs sometimes in a too prolonged convalescence. ...h a change restores the interests in life and stimulates the ...to a greater amount of self-control. Speaking generally, ... I am of opinion that the best chance of complete recovery ...recurrence of the disease is secured by the patient's residence ...hospital until such recovery has not only taken place, but may ...to be established.

Danger of Recurrence.—In many forms of ordinary disease the ...are liable to a recurrence at some time or other after recovery ...place. Gout, rheumatism, bronchitis are common examples ...tendency. Mental disease is liable to recur in at least 20 per ...those who have recovered, and in many cases this tendency ...over and over again. There are a certain number of cases ...the more frequent the occurrence the greater the danger is of a ...curability, but this not apply to all of them. I have known ...cases recover and relapse on very many occasions, the recoveries ...good ones while they lasted, and the patient able to take his ...in society and do his usual work. The classic case of Charles ...and his sister is an example. In many cases that have this ...the treating of the symptoms in time, before they have ...ped into serious mental disease, is the great principle to be ...d. Cure the insomnia, restore the nutrition, give a chance for ...rest, change the current of ideas and thoughts, remove causes ...tion or exhaustion, give a fillip to the mental life—these are all ...of effective treatment, and they improve prognosis in most

...ally the danger of recurrence is scientifically brought out ...Scottish statistics referred to on page 429.

Heredity as an Element in Prognosis.—The influence of [illegible] heredity in making any man or woman liable to mental disease has always been taken into account by those with experience in the medical profession. It was evident, on even casual observation, that some families were more liable to such diseases than others. Of recent years much more careful clinical and statistical knowledge on this point has been obtained. The ordinary methods of scientific statistics, and those of biometrics, have been called in to attain accuracy, with more, but not as yet complete, success. Dr. Karl Pearson and Dr. Mott are the latest authorities on this important subject, and their work has undoubtedly advanced our knowledge. For myself I have much more faith in what may be called the clinico-statistical methods of Dr. Mott than those of the purely mathematical methods of Dr. Karl Pearson. Two things in regard to heredity I would especially impress on the readers of this article: the worst and the most direct heredity need not imply the occurrence of mental disease in any family, and the existence of heredity, even strong heredity, does not necessarily imply incurability in any case. We are nowadays continually asked about the liabilities to mental and nervous disease in certain families when there are intentions of marriage, proposals of insurance, uncertainties about taking to certain occupations or professions, and thoughts of going to live in certain climates. This reading of the horoscope of human beings is, or ought to be, a department of prognosis, and as our scientific knowledge increases it will become an extremely important part. It is already affecting the great science of education in a marked degree. It is affecting certain acts of the legislature that relate to social questions. It may be said to be affecting men's views of ethics and of human conduct. It has also a relation to literature, especially in history and biography. Long ago, in reading Carlyle's biography of Frederick the Great, one was impressed by the fact that that shrewd writer devoted his first volume entirely to Frederick's ancestry and relations, their history and characters. He did not use the word heredity, but that volume is a treatise on the subject notwithstanding.

The keynote of the new science of eugenics depends on heredity, and as a result of the perfecting of that science, prognosis, in a large sense, will be made far more accurate. It may be described indeed as the most comprehensive field of prognosis at present in existence, for all its aims consist of looking to the future in human life.

In the prognosis of mental diseases it is to be remembered that it is not the special mental defect or disturbance that is inherited, but a general defect of brain nutrition, or an instability of action in the higher brain cells, or a deficiency of resistance against toxins or against mentally upsetting causes. Heredity may consist, and in many cases of mental disease at the adolescent period does consist, of a want of ability to adjust the action of the brain cells—the vehicles of mind—to the more complicated and evolved life of civilized man as compared with that of primitive ancestors. Dr. Mercier says: "The stability

[illegible]sity of a person's highest nervous arrangements depends [illegible] and chiefly on inheritance." Without evil mental heredity [illegible]ld be very little unsoundness of mind in the world. It is [illegible] chief problems of psychiatry. In considering the heredity [illegible] mental disease with a view to prognosis, we must inevit[illegible]der whether the defects in fathers or mothers, if any such exist, were personally acquired, or derived from an ancestry further [illegible] To a large extent the belief as to the non-transmissibility of [illegible]ally acquired characters held the field till lately, but a [illegible]eration of scientists are of opinion that, in certain circumstances, they may be transmitted. Professor Cossar Ewart, a great [illegible] as the result of practical experiments, says that "the germ [illegible]able to be influenced by fever and other forms of disease that for the time being, diminish the vitality of the parents," and we have also the great authority of Darwin, Maudsley, and Hertwig for holdin[illegible] views.

[illegible] find, in addition to a bad hereditary history, that there are [illegible] abnormalities in our patients, which we now call 'stigmata of [illegible]ation,' the prognosis is considerably worsened. In inquiring into the heredity of any case, we must take into account not only mental [illegible] neurological facts, such as epilepsy, malformations, convulsions, [illegible] asthma, stammering, hysteria, and many other such allied [illegible] One law of mental heredity laid down by me long ago, and [illegible]ly confirmed on larger statistics by Dr. Mott, is that any mental defect in ancestry is liable to occur at an earlier age in posterity than [illegible] at which it occurred in parents. It is also a fact that the [illegible]d heredity towards mental and other nervous diseases is stronger [illegible] the paternal, and the mental defects tend to cross the sexes from mother to son, etc. It is also certain that while a strong heredity does [illegible]ply incurability to any one attack, yet it does produce a greater [illegible] to recurrence of the disease; and, finally, as a most important consideration in prognosis, few of us now doubt that in a vast number [illegible] a bad heredity can be counteracted, in some degree at least, [illegible]ained, by favourable environment and modes of life.

The Age of the Patients.—Youth, in mental diseases, as in all [illegible] is a favourable element in prognosis, *ceteris paribus*. Some mental diseases, such as senile dementia, are incurable simply because the patient is old. Some others are apt to recover because they occur in the developmental period of life. Nature always tends towards [illegible] she has a fair chance. Some diseases, such as choreic insanity, will almost necessarily recover because they are developmental in their character.

Completeness of the Recovery.—The prognosis in all our cases [illegible] depends on whether the attack has been absolutely and completely recovered from. In mental disease, unfortunately, there are [illegible] be left certain of the slighter peculiarities of character and con[illegible] These, if they persist too long, are liable to become brain habits [illegible]ult to get rid of.

Temperament. The original temperament of the patient, to a certain extent, determines the prognosis of his attack if he falls into certain forms of mental disease. Melancholia in a markedly melancholic temperament is not so curable as in a sanguine temperament. Mania is not so curable in the case of an excitable, boisterous, nervous temperament as in a man with an ordinary average working brain.

Conditions of Simple Mental Depression and Elevation—Manic-depressive Insanity

Whatever classification of mental disease may ultimately be adopted, I am satisfied that there are certain morbid conditions which for the general practitioner and the relatives of patients it will always be necessary to reckon with and to treat as distinct forms of disease. The chief of these are states of mental depression and mental elevation with diminished self-control. From the earliest times in the history of medicine these have been recognized. The terms melancholia and mania have become a part, not only of medical books but of popular language and of literature. The conditions I am to describe are those which are apt to come under the notice of the medical practitioner in his ordinary work, commonly before a specialist is called in. It is essential, therefore, that right conceptions regarding their nature, causes, risks, prognosis, and treatment should be held by every doctor. Especially when they exist in a minor degree and constitute what we now call the 'borderland,' it is important that they should be subjected to the right kind of treatment, and that their prognosis should be well considered. I believe if proper treatment is carried out they may be arrested in many cases, and recoveries may be brought about before they reach their more serious stages, the necessity of being placed in mental hospitals thus being avoided. I shall refer both to my experience in treating them in a mental hospital, and also as a consulting physician where I had to advise as to their treatment in private houses, in rooms, or in nursing homes.

Among the practical classifications adopted in most mental hospitals, conditions of depression are usually assorted into the varieties of simple, hypochondriacal, delusional, suicidal, resistive, excited, and stuperose. The cases of simple melancholia are those which the general practitioner of medicine sees most of from start to finish. It is the most rational of all the insanities. The patients themselves and their relations usually object to its being called mental disease at all. They talk of it as 'nervous depression,' 'melancholy,' 'low spirits,' being 'out of sorts,' and being 'run down.' I am not of course alluding to the cases of mere physiological depression of mind from natural emotional causes. Mere physiological melancholy might be defined as a sense of ill-being and a feeling of mental pain, with no real perversion of the normal reasoning power, no morbid loss of self-control, no impulses towards suicide, the power of working not

[illegible] lessened, and the ordinary interests of life only lessened, not [illegible]. The simple melancholia, whose prognosis I am to treat [illegible] purely pathological condition of the brain cortex, accompanied [illegible] pain, emotional depression, a sense of ill-being more intense [illegible] melancholy, with some loss of self-control or volitional power, [illegible] a tendency to delusion of a depressed character, the power [illegible] ordinary work being greatly diminished or abolished, the [illegible] of life interfered with, and with discoverable bodily sym[illegible] in nine cases out of ten.

[illegible] examination of such cases the patient himself is of the [illegible] importance, because he knows he is ill, sometimes perhaps [illegible] his symptoms. The patient's 'objective consciousness' [illegible] acute, while his 'subjective consciousness' is exaggerated. [illegible] patient is usually run down in body, and has had some physical [illegible] antecedents which have been the cause of his trouble. [illegible] usually more or less insomnia. The patient has either a [illegible] more or less irritable feeling, his work instead of being [illegible] a conscious toil, he has a sense of ill-being, the opposite [illegible] normal sense of well-being which is to all mankind the best [illegible] of health. The nutrition of the body is lowered: commonly [illegible] want of appetite and constipation. The depression is nearly [illegible] worst in the morning. This is a fact well worth keeping in [illegible] treatment and prognosis, for certain measures can often be [illegible] to rouse the brain from this morning depression into somewhat [illegible] action. It is not often kept in mind that sleep, in addition [illegible] marvellous condition of unconsciousness which accompanies [illegible] so alter the working of the higher cortical cells or their capil[illegible] circulation that they do not resume work for a little time after [illegible] is past. In a minor degree this is a common enough thing in [illegible] who are far from being mentally diseased.

Although the definition of this simple state of melancholia cannot [illegible] it having no definite boundary lines from either sanity on the [illegible] and, or the more severe varieties of the disease on the other, we [illegible] practical purposes ask: What are its chances of recovery and [illegible] general prognosis, its liability to relapse, and the fear, if any, of [illegible] result? The general prognosis is unquestionably a favourable [illegible] but in order to give a statistical basis for that opinion I shall [illegible] my experience during the last ten years I was Physician-Super[illegible] of the Royal Edinburgh Mental Hospital, from 1897 till [illegible]. I must explain that while this condition of simple melancholia [illegible] usually be quite well treated at home if the patient's finances [illegible] of it, it is expensive if practicable. For the poor and the [illegible] 'middle class,' most of the cases have to be sent to mental [illegible] on account of there being no means of proper treatment, [illegible] the patients not being able to earn their own livelihood. In [illegible] years I had under my care altogether 4319 cases of mental [illegible]. Of these, 414 were cases of simple melancholia. It is there[illegible] one of the most frequent of all the varieties of mental disorder.

Of the 411 cases, 225 recovered, or 54·8 per cent. Considering that two-thirds of the remainder were discharged technically relieved, and one-third of these probably completed their recovery after leaving home, I think it would be a reasonably correct estimate to assume that 70 per cent. is the chance of reaching a recovery in these cases. The rest of the cases, the 30 per cent., passed either into the more severe varieties of melancholia or into dementia, while a few died. Less than 1 per cent. died, and that was through the exhaustion of acute symptoms, coming on or through their becoming so low in nutrition that intercurrent diseases, such as phthisis, pneumonia, etc., carried them off. I note only very few of these cases of simple melancholia were really suicidal. All the suicidal cases, or rather the worst of them, I included under the separate heading of suicidal melancholia, but no doubt the general idea that life is not worth having, and some little risk of suicide, was present in some of them.

It is interesting to compare all the cases of melancholia, the simple and the more severe, as to prognosis, with the special group that I have called simple. There were altogether 1465 cases grouped under melancholia, including the simple variety, and of the total number 43·7 per cent recovered. Adding the proportion of the relieved, which is not so great as in the simple variety alone, the general prognosis as to recovery in conditions of depression of mind sufficiently severe to be sent to institutions may be put down at about 55 per cent.

Duration.—Patients themselves and their relations are commonly very urgent, not only as to whether recovery will take place, but how long the symptoms will last. This is the most difficult part of the prognosis in all mental cases. The grounds for giving a time limit are always somewhat uncertain; the data are commonly insufficient.

Simple melancholia, however mild in its symptoms, is not one of the mental disorders that we expect to pass off suddenly; its recovery is usually gradual, and we cannot count on a case recovering speedily because its symptoms are specially mild. There are some cases of simple melancholia that recover within three months, but, taking them all, their duration is over that time. We may, however, reasonably expect a recovery in this disease within six months from its beginning. Only about 10 per cent persist for over a year before recovery. Certainly three-fourths of the recoveries take place in that time. Its symptoms are so mild in many cases that it is difficult to say when a complete recovery has taken place. In the above estimate of recovery I assume that the patient has been for a month free from any symptoms of mental depression before the statistics are drawn up. Simple melancholia is one of the diseases from which a complete recovery is not only possible, but is likely to occur.

Indications of Improvement.—In nearly all cases of melancholia the symptoms are worst in the morning and forenoon, while the patients improve towards afternoon and evening. It may be held to be a good sign when the evening remissions are complete, the patient

[illegible] and if along with this the morning exacerbation [illegible] at the beginning of the disease, it is also a good [illegible] In most cases of melancholia the patients are not [illegible] occupation or any occupation in a continuous [illegible] they do some work it is done with little interest [illegible] forced. It is always a good sign when a patient is [illegible] any kind of occupation for any part of the day. W[illegible] such patients by keeping them in bed at first. If this [illegible] effect, it is a good sign as making for recovery. I con[illegible] that, in the case of women who have been accustomed to that [illegible] amusement, that simple knitting is a most excellent occupa[illegible] simple, not requiring any great amount of attention, and [illegible] muscular effort. When the patients become [illegible] for active outdoor exercise it is always a good sign. If the [illegible] nerve tonics, which we usually employ as a remedy in [illegible] manifestly have an effect for good on the brain action [illegible] good sign. Above all, if the patients gain weight steadily, and [illegible] appetites and digestion improve, it is a favourable sign [illegible] being a frequent accompaniment of melancholia, it [illegible] means a general betterment when the bowels resume their [illegible] action. If the skin becomes softer and the perspiration more [illegible] may be looked upon as favourable in prognosis. If the [illegible] have had, as most of them have, an idea that they will not [illegible] get better, and cease to be obsessed in this way, and begin [illegible] that there is a hope of their recovery, it is a sure sign that [illegible] on the way to recovery. It is one of the great means of [illegible] treatment to assure every melancholic patient that he will [illegible] get better, and I am in the habit of telling my nurses to [illegible] this to every such patient at least a dozen times a day. This [illegible] mate 'mind cure.' If the patient has been restless and that [illegible] diminishes, it is a good sign. If there had been any ten[illegible] seclusion and that diminishes in force, it is also a good [illegible] that recovery is soon going to take place. There is a [illegible] which I have often noticed in cases of melancholia. The [illegible] during the earlier part of the disease, are often abnormally [illegible] in will-power and are too calm in temper. If a stage of [illegible] comes on I look on it as a good sign. I had one patient [illegible] I was always glad to hear using strong language. I knew then [illegible] was going to recover. The conscious sense of organic well-[illegible] the last to come, that being the best subjective sign of health. [illegible] worthy of observation is the return of minor neuroses or [illegible] to which the patient may have been subject, e.g., headaches, [illegible] skin troubles, etc. When these are seen it is a good sign of [illegible] mental recovery. If a patient has had a quick and [illegible] pulse, and that disappears, it is a good sign.

Unfavourable Indications.—The following symptoms are those which [illegible] the prognosis more uncertain or entirely unfavourable. If the [illegible] of the depression has been exceedingly slow and gradual, and

its symptoms more and more serious in their development, if there is a gradual decay of bodily vigour, like a premature old age, and a persistent loss of nutritive tone and bodily weight that will not yield to diet and treatment, it is a bad sign. If hallucinations of hearing come on, we do not like it. If there are convulsive attacks or slight shocks of paralysis, we know that organic disease of the brain cells has set in and that there is little hope of mental recovery, but I have seen many exceptions to this. If the patient in facial expression takes on a prematurely old appearance, it is not a good sign, or if the emotional depression of face and eye gets permanently fixed without any smile, or if muscular expressions of mental pain come on such as wringing of the hands, groaning, etc., or if a suicidal tendency develops and gets extremely intense, these are bad signs. If there are proofs of marked arteriosclerosis or other vascular degenerations they add much gravity to the prognosis. If there is seen a general weakening of the mental power, the memory, power of attention, and interest in life, the patients becoming somewhat facile and too content, it is an indication that dementia is threatened, but simple melancholia is of all mental diseases one of those least subject to pass into dementia. As I have mentioned, however, hope of recovery should be entertained as long as anything like decided depression of mind exists, even for years. I have known a case of melancholia recover after twenty years. If the disease has come on during, or in consequence of, an epoch in life like adolescence, pregnancy, or the climacteric, recovery may be looked upon as more likely when such an epoch has passed away. Senility is not in itself an absolute bar to recovery. I shall refer to the fact, when I speak of senile insanity, that its melancholic forms recover in a reasonable proportion of the cases.

Periodicity and Recurrence. The patients themselves and their relations are nearly always anxious as to whether the trouble is likely to return. The prognosis in regard to this must be somewhat guarded in all forms of mental disease, which, taken all together, recur in about 20 per cent. of the recoveries. Simple melancholia is not a disorder that is specially apt to recur unless the temperament of the patient is an extremely sensitive one. A certain mental hypersensitiveness of disposition is, in my opinion, the psychological basis on which most cases of melancholia are implanted. It may be put down, in fact, as its chief predisposing cause. This hypersensitiveness is so extreme in some cases that its unfortunate possessors may be said to be always on the verge of simple depression of mind. I had a lady patient once who was liable to be thrown into such a condition on almost the slightest occasion of worry, distress, disappointment, or loss. She had several attacks when she lost relations, she had one when her favourite dog died, and she could never stand a too exciting sermon at church. Some persons with a strong neurotic heredity of brain are liable to depression during the epochs of life I have referred to. Some people are liable to an attack whenever

overwork themselves, mentally or physically, whenever they an attack of indigestion, or whenever they are 'run down.' ng simple melancholia as a whole, the liability to recurrence or licity may be put down at about 15 per cent of all the cases. always a right thing for the doctor, when he is in attendance on case, to assure his patient that there is no chance of recurrence will keep his health in good condition and adopt means of treat- at the very earliest stage or if he should feel the least symptom epression, loss of weight, or sleeplessness. I advise most of my ncholic recoveries to weigh themselves regularly. It is to be n mind that the slighter forms of depression are liable to occur ecludes to most other forms of insanity, and during the very first t of those attacks the doctor has to think of this in his prognosis.

Other Forms of Melancholia. As I mentioned, melancholia occurs proportion of 35 per cent of all the cases of insanity sent to tutions. Taking all the cases who consult doctors privately on nt of mental symptoms, I would say that mental depression ls in the proportion of at least 80 per cent. The general prognosis l forms of melancholia is represented by the 43·7 per cent which referred to. While the simple melancholia of which I have ted is by far the most curable variety, it is not the only one that ble.

Suicidal. First let us look at the most serious of all the complica- of melancholia, namely, the suicidal impulse. This is so common t it exists in lesser or greater degree in about four-fifths of all the of melancholia, but, in great intensity and constituting a serious it only applies to two-fifths of the cases, and those we classify as atically the suicidal variety. It is a common idea that when a ent is strongly suicidal he is therefore incurable. This is certainly a correct view. Its gravity and its risks should not make one a despairing view of even a very suicidal case. They recover s great a proportion as the ordinary cases if we exclude the simple ety.

Delusional Melancholia. The next variety of melancholia, which call the delusional form, is much more serious than the suicidal the prognosis. By this term is not meant melancholia with delu- It is used to indicate that variety of the disease in which a sion or delusions are from the beginning the most prominent aptom, in which they remain throughout the disease of the same ure, giving the attack a distinctive character, being what are lled fixed delusions, in contradistinction to milder delusions that nge in kind, or subject, or degree. The relatives of such patients apt to call it the cause of the disease, when scientifically it is erely the most marked symptom. The real disease consists of the pression, the mental pain which is at the bottom of the delusion l underlies all the other symptoms. In such a case of delusional elancholia the prognosis is undoubtedly unfavourable, especially the delusions last for over the first six months of the case. The

delusional cases constitute about 25 per cent of the melancholies. The delusional and the suicidal symptoms may combine in the same case, and this constitutes a grave prognosis.

Homicidal feelings and attempts sometimes occur in melancholia, and constitute a grave element in the prognosis, without, however, indicating incurability. I have known many cases of simple melancholia with vague homicidal feelings, but the real danger of homicide is found chiefly in the excited variety of which I am about to speak, and at the beginning of the attack.

Excited and Resistive Melancholia.—Extreme agitation and excitement as a part of the disease may be the distinguishing characteristic of an attack from the beginning till near the end of its course, or it may occur as one stage in its complete clinical history. The patients in such cases rush about, may be violent to those about them, wander ceaselessly, walk up and down, and cannot sit still for any length of time, roll about on the floor, bite their finger-nails, or wring their hands, or shout, or groan, and weep loudly, or tear their clothes. In short, the muscular expressions of the pervading morbid emotion are strong and uncontrollable by their wills. This really constitutes the worst variety of the disease, and by far the most difficult to manage, rendering institution treatment necessary in almost all the cases. The presence of this agitation is determined either by the intensity of the disease or the temperament of the patient. The Celtic races are apt to show it more than the Teutonic. Delirium tremens in the acute form may be taken clinically as representing excited melancholia. There are apt to be hallucinations of the senses in this form, and a toxic element in the etiology.

Along with excitement, or, in some cases, without much motor excitement, there are cases of melancholia which are intensely obstinate and resistive in their conduct. They will not go to bed, they will not undress, they will not do what they are wanted to, and some of them are stuperose in their character. The expression of face in these cases is utterly changed from the normal.

The excited and resistive varieties constitute what is often called 'acute' melancholia. The prognosis in such cases is worse than in any form of the disease. It is apt to run on into a chronic condition, or the patient dies of exhaustion. Certainly not more than one-fourth of such cases recover. These forms are often associated also with a strong suicidal tendency.

Hypochondriacal Melancholia. A somewhat distinctive form of the disease is characterized by hypochondriacal symptoms in which the mental pain has a certain want of intensity, and takes the form of fancies which centre round the patient's own health. He thinks he is all out of sorts, that his digestion is wrong, that his stomach is all out of order, that his heart is weak, that he is certainly going to die of paralysis or some other trouble which is really imaginary. There are no limits to the fancies of the hypochondriac. Now this class of symptom adds considerably to the gravity of the prognosis. Such

nts are not apt to recover quickly, and more than one-half of do not recover at all. They are a very troublesome class to doctor, because the patient is continually wanting to see him pour out accounts of his imaginary illnesses to him. Although ls the patient complains of may be entirely absent as real objec- facts, yet they represent an organic sense of ill-being and are real to his consciousness. There is little risk of suicide in the s in these cases, except in the very worst class of them. le is often talked of and threatened, but seldom carried out. inary cases of melancholia, when a patient is deeply depressed, s little about suicide but thinks a great deal of it. These are ally dangerous cases. When a man is constantly talking of s sometimes in the hypochondriac, there is certainly very s risk of his committing the act; but still I have known it en when it had been much spoken of previously.

States of Depression as seen in Private Practice.— The statistics conditions as met with in private and consultation practice erhaps more instructive to the general practitioner than those of tutions, even if they are not quite so exact. The patients are tly in the early stages of the disease, and they are still living under ordinary home conditions of treating disease. They are in every more analogous to cases in ordinary practice. As the results of treatment are not to be found in the text-books, I give them

I have taken the last 200 consecutive cases that I have seen in sultation and have analyzed them. I find of the 200 there were who laboured under depression of mind, who mostly knew they ill, and had themselves desired or were persuaded to consult a ntal specialist for their symptoms. I usually had the advantage, a great one—of getting the previously acquired knowledge of family doctor as to the patient's previous history and mental ptoms that had appeared. I was not able to follow the mental tory of all these patients—that is one of the disadvantages of a sultant. At least 21 of them thus passed out of my medical wledge. But I know that 88 of the 104 were said to have covered,' that is, a total recovery rate of 84 per cent. That repre- ts the curability *of the present attack* in the milder cases of melan- lia. If one relied on this experience, a condition of depression ld seem to be a very curable disease indeed. But I knew many them would be likely to relapse, some of them over and over again. inquiries into that point brought out this fact. I ascertained t 36 of them had recurrences or relapses, and I have no doubt that ber does not represent the full facts. Deducting this 36 from 88 'recoveries,' it leaves a proportion of exactly one-half as being ssible permanent recoveries. The relapses did not take place in ny of the patients for years, so that in those cases the 'recoveries' just as real as recoveries from gout or rheumatism and many her diseases often are. I knew that at least ten of these relapses

passed into *folie circulaire*, or dementia, or other incurable mental states. Almost all these patients were in comfortable circumstances, so that they could afford to obtain skilled nursing, changes of environment, etc.

Melancholia is apt to be the first form of mental disturbance when it occurs in any family up to that time free from it. Being the same form of mental disturbance, it is the most curable and the least damaging to the brain when it is recovered from.

Premonitory Symptoms. In the early stages of melancholia, the patients very frequently have a sense of impending danger, of loss of self-control, and that they may take away their own lives. This feeling causes great distress and aggravates the painful symptoms of the disease very much. It is certainly a symptom that is not to be disregarded in the prognosis, and especially in regard to the precautions to be taken. The patient perhaps does not speak of it to anyone but his doctor. Relatives usually pooh-pooh the symptom as not being worth taking much notice of, because the patient at the time is self-controlled, and can pull himself together and look very much as usual in the presence of strangers. One of the difficulties of its treatment and prognosis is this, that constant watching, though it may be necessary in many cases, may add greatly to the patient's depression, thus aggravating the disease; the watching against the symptom, in short, acts as a continual suggestion that it is present. There are three kinds of cases which, in my experience, make it almost impossible to provide absolutely against attempts at suicide. These are, first, those latent early cases, and secondly, those where, during the course of the disease, explosions, as it were, of suicidal impulse come on suddenly without any preliminary symptoms. The third is where the patient exhibits extreme cunning in concealing his impulses and extreme determination in carrying them out. As regards the doctor in attendance, wherever there is any suicidal impulse, or any reasonable clinical risk of it, he is bound to take precautions and to intimate its existence, in an earnest, impressive way, to the nurses and attendants and to the responsible relatives of the patient.

Conditions of Mental Exaltation—Mania.

Both the symptoms and the prognosis are different where we have emotional and intellectual exaltation as the chief symptom, as compared with the depression of which I have been speaking. Exaltation in any form is a more insane symptom than the milder degrees of depression. The patients usually do not recognize they are ill, as the melancholics so frequently do. There are conditions of what may be called physiological exaltation, as in healthy childhood. A grown-up man or woman who behaved like such a child would be in a condition of mental disorder. Then there is the natural exaltation of feeling resulting from good news or good fortune. This may, in some cases, pass into pathological exaltation in certain temperaments. A certain

ry kind of morbid elevation is apt to occur as a complication rs and other diseases in children of a strongly neurotic tempera- We think differently of conditions of depression and of exalta- tion The former we are apt to think of chiefly from the patient's own tive point of view, the latter from the objective evidences of his t and speech. There are certain conditions of exaltation where sure, and happiness are the characteristic emotional states, and there are others where rage, discontent, and irritability are its chief manifestations. Most cases of mania are accompanied by 'excite- that is, have visible muscular acts as its symptoms, whereas ple melancholia no such excitement need be present

a clinical fact, mania divides itself into varieties, just as melan- does, and the character of these varieties markedly affects the s in individual cases. The chief of these varieties are the the acute, the delusional, and the chronic.

Simple Exaltation.—I had under my care, during the ten years s 1907, in the Royal Edinburgh Mental Hospital, 800 cases of mania out of 1754 maniacal cases altogether, and, of that 800, s recovered, giving a favourable prognosis of 43·5 per cent. In tion to those recoveries, a certain number more were discharged l, some of whom no doubt completed their recoveries after the institution, but there were not nearly so many of such d patients among them as among the melancholics. I think if rent were added to the 43·5 per cent of recoveries, it would repre the total curability of conditions of exaltation so marked as to be insane. This gives a prognosis in such states of 10·5 per s than that among the depressed, in the simple varieties of the

In the general outlook of a patient who suffers from morbid mental ation, there are different risks and different things to be considered those suffering from depression. An exalted patient will com not commit suicide, or think of it. He will attract more atten- from others of an unfavourable kind; he will be looked on as a 'fool.' He will have far more chance of losing any work tuation he has, he will be more likely to ruin himself by foolish n or speculation, he will run more of getting into the hands public authorities, and he will be far more apt to produce dis- ances in his family and social relations. The greatest of all human ities, that of will power and self-control, is very much more ned. His moral sense is lessened in such a way that he is liable mmit acts of immorality; the conventionalities of life are lessened m, and he sets them aside. In his dress, and in the company he keeps, he changes his normal habits. He is much more frequently, and is sooner, certified to be insane and sent to an institution for care t treatment, and from the beginning this contingency is to be kept and by the doctor and explained to the relations. It is more easy persuade relatives that this step is necessary than in the case of pression of mind. Mental exaltation is not so apt to be gradual in

its beginnings as depression. It comes to a head faster. There are fewer cases of simple mania in the total number of cases of exaltation compared with melancholia. It is characterized less by nutritional defects. The man suffering from simple mania eats well, sometimes in excessive amount, and keeps up his strength. His temperature is slightly higher than the melancholic. Instead of putting him to bed and giving him rest and massage as a form of treatment we tend in most cases to give him a great deal of exercise in the fresh air, to put him to dig, or to send him away on a walking or bicycling tour with his attendant or a friend. We are far less sure of what he will do and of how the case will turn out than where we have simple depression.

Comparing simple exaltation with all the other forms of mania, the percentage of recoveries is only about 3 per cent greater, thus showing that there is not so great a difference between simple mania and its other forms as between simple melancholia and other forms of depression. It is in fact not so curable a disease. The brain is more disturbed in its action and not so liable to recover when exaltation is present as when the disturbance consists of depression. The 414 cases of simple depression sent to the institution in the ten years, as compared with the 800 cases of simple exaltation, is not a proof, in my opinion, that the exalted conditions are more frequent, but that they are of a character that cannot readily be managed at home and are therefore sent to asylums much more frequently.

Recurrence. I have no quite definite statistics showing the liability to recurrence in cases of simple mania, but my opinion is decided that it is more liable to recurrence, and certainly it is more liable to pass into other and deeper forms of mental disease, than states of depression.

Acute Mania.—This state, being the most vivid and dramatic of all forms of mental disease, is very often taken as the type of all the insanities. It is the 'raving madness' of literature. It is the least rational, the least conscious, the most noisy, and most unmanageable of all the forms except general paralysis. Unfortunately, being thus so very distinctive, it has affected the conception, the treatment, and the prognosis of all forms of mental disease in a very unfavourable way until recent times. The man in the street thinks of every case of mental disease as of this type. Its treatment in old times consisted of manacles, chains, darkness, and stripes, and its prognosis was usually put down as entirely hopeless. It is not really a common variety of mental disease, for, out of 2377 admissions into the Royal Edinburgh Mental Hospital during the seven years 1874–1880, only 297, or about 8 per cent, were so classified.

Acute mania begins in various ways, sometimes by the condition of simple mania, but often quite suddenly. At times it has the melancholic prelude to which I have alluded. Bodily symptoms are more apt to be present than in most varieties of insanity except general paralysis. The temperature is raised, weight is rapidly lost, and great exhaustion occurs in a short time in most cases. The prognosis as regards recovery is not nearly so bad as was formerly thought. My

was that 60 per cent of the asylum cases recovered, 7½ per
l, 32½ passed into chronic mania and dementia. This liability
l issue is greater than in any other form of mental diseas
erperal insanity and general paralysis. There is no form of
ase where there is more liability to the brain losing its higher
mind and sinking into an incurable mental condition. That
the greatest risk of all, and the greatest anxiety to the doctor
sponsible for its treatment. There is a very acute form of
ase, called by many authors 'delirious mania,' or acute
which clinically may be reckoned as the worst type of acute
In that form the prognosis, in regard both to recovery and
is very much worse than in ordinary acute mania. Some
y that delirious mania is almost invariably fatal, but that
experience. In some books this is called typho-mania.
at opinion in psychiatry tends to put down almost all cases
mania, and many of acute mania, as being forms of brain
although no specific organism has as yet been detected
the high temperature, and many of the other symptoms
a toxin whose action has focussed itself, as it were, on the
cal brain cells.

Indications for Prognosis. If the disease has come on suddenly,
at organic functions of the body are not especially affected,
of course good signs. If the stomach and bowels and digestion
in a normal way, if the heart's action is not unduly weakened
rature does not rise above 101°, if the common sensation
luly impaired, if the mucous membranes of the mouth and
not dry, if weight is not lost at the rate of more than four
a week, and if the general strength shows no signs of exhaus-
ng the first fortnight, then we may have good hopes of the
ultimate recovery under proper treatment. If he begins
weight rapidly, it is perhaps the most favourable bodily sign
aching recovery that can appear. If the disease does not last
ute form more than a month, if there are no signs of a general
ment of mind after the first six or twelve months, if there is no
to fixed delusion, these are all good indications in the prog-
Nowadays we commonly put our acutely maniacal patients
for the first few weeks, and if this is successful in calming them,
on it as a favourable indication. If prolonged bathing treat
adopted, and the patients submit to this quietly and are the
for it, that shows that the attack will probably be recovered
If this treatment by warm baths, with perhaps the use of mild
es, has the result of soothing the patients' excitement in a
way, their recovery will probably be speedy. If the habits
very uncleanly, and improve under care, it is a good sign.

Unfavourable Indications.—If the temperature is persistently over
f the loss in weight amounts, as I have seen in some cases, to
pounds in a week, if the mucous membranes are persistently
there is a 'muttering delirium' at night, and if there are marked

signs of general exhaustion with heart failure, these are all unfavourable indications as to recovery and life. Some cases of acute mania die from exhaustion in spite of everything that can be done, and some of these die very quickly and suddenly, within the first fortnight. We now think that in such cases the toxæmia has been of a very acute character. If there have been hallucinations of the senses and these show a tendency to persist, it is an unfavourable sign. If the acute symptoms are entirely intractable and go on for perhaps a year without much change, we fear that it may pass into chronic mania. But the result which we dread above all things is that of dementia, of which I have spoken, and the early symptoms of this consist of a diminution of the active maniacal symptoms, a blurring and deterioration of the expression in the face and eye, a lack of the power of attention to what is going on, a want of interest in the people about him, or in suitable occupation, a persistent lack of orientation and a lowered emotional condition, with a loss of social instinct and the persistence of very dirty habits—all these, especially if the patient is in the period of adolescence, are unfavourable indications for complete recovery. They mean that the brain cells are undergoing demonstrable deterioration or atrophy. This affects at least 50 per cent of all the cells in bad cases.

Tendency to Recurrence or Complete Recovery.—Acute mania is a condition which is not apt to recur, and when it has been of short duration it may be completely recovered from and leave the brain and the man in a normal condition.

Chronic Mania.—This is really, as to its symptoms, acute mania somewhat modified in certain particulars and running a chronic course. I put down the time limit here as twelve months, but undoubtedly there are some cases of acute mania who recover after that time. Chronic mania is an incurable disease, but many patients live a long time suffering from this condition. There is a spice of enfeeblement of mind in chronic mania, the memory is impaired, the habits and fine feelings are degraded or dulled, the emotional power and social instinct are usually almost paralyzed, and the power of attention is usually much lessened, although some patients are extremely sharp and observant.

Delusional Mania.—Some cases of mania have from the beginning a strong and fixed delusional element on which the symptoms of excitement seem to hang. A man believes that he has been persecuted by his relations and friends, and he seems to get excited *in consequence* of this delusion. I had a patient who shouted, scolded, and was violent, almost all day, alleging as the reason of her conduct that her children were below the boards of the floor, and that she heard them constantly being tortured by villains who were killing them. The prognosis in this form of mania is certainly unfavourable, though individual cases sometimes recover. It is often accompanied by vivid hallucinations both of hearing and sight, and these are unfavourable, particularly the auditory hallucinations, if they last long.

Mania in all its Forms—Statistics.—Taking every form of morbid [illegible] exaltation, I had 1757 cases in the Royal Edinburgh Asylum [illegible] ten years I have referred to, of which 715 recovered, which [illegible] a percentage of 40·7, being 3 per cent less than that of melan- [illegible] and I think that the patients who were discharged relieved did not recover at home in anything like the same proportion as the melancholics did. About 5 per cent may be added to the 40·7, making about 45 per cent as a general prognostic chance in mania. The whole [illegible] of cases of mania were 1757, as compared with the 1465 melancholics, during the ten years; but, as I have stated, this does [illegible] at the real liability to depression and exaltation of mind in the population

[illegible] to conditions of morbid exaltation seen in private practice, [illegible] of these out of 200 consecutive cases, or 12 per cent, con- [illegible] this with the 52 per cent of cases of depression. Twelve of [illegible] recovered, a percentage of 39, as compared with the 88 per cent [illegible] melancholics. I ascertained that 5 out of the 12 recoveries had [illegible] or 41 per cent, which is the same proportion as the melancholics. The lesser number of elevated cases I saw as compared with [illegible] seen may not necessarily prove a lesser occurrence of morbid [illegible] on the brain-working of the community, but be due to the fact that patients suffering from mania are less apt to come or be brought to a consultant. They usually do not recognize they are ill, and they are so decidedly more insane that they are much more apt to be removed to mental hospitals at once. The lesser percentage of recoveries I met with in private practice among the cases of mania may be partly accounted for through the greater mildness and manageability of the symptoms in melancholia, so that many more of them could be treated [illegible] homes or in rooms during the curable stage of their attacks.

Manic-depressive Mental Disease.—All authors on mental [illegible] had noticed a certain relationship between cases of mania [illegible] melancholia. I stated in my "Clinical Lectures" that "there [illegible] in the majority of nearly all the acute cases at some time or [illegible] in some form or degree, in some stage of the disease, a tendency [illegible] remission, periodicity of symptoms, remissions, or recurring re- [illegible] My statistics showed that about 44 per cent of all my cases [illegible] insanity showed those characteristics, but, by confining ourselves to cases of mania and melancholia, at least 46 per cent had these special features. All physicians in charge of mental hospitals knew [illegible] certain cases of mania might become depressed, and vice versa, [illegible] the same attack, also that a patient might come in at one time [illegible] mania and his next attack would be melancholia. We all con- [illegible] that those two conditions had a certain relationship to each [illegible] but it was reserved for Kraepelin, of Munich, to throw the two [illegible] into one for purposes of classification, and call it "manic-depressive insanity." He maintained that a very large number of cases of either condition actually had some symptoms of the other, if the whole mental life were taken into consideration. His subsequent

experience and more careful study of the subject has led him to the belief that there are practically no cases of mania that have not had a melancholic phase, and that there are perhaps a few more [illegible] cases of melancholia that have not a maniacal phase. His general conclusion from these facts is that, in essential nature and in forming the basis of a true classification, they all ought to be thought together and called by one term—not two. That there is a great [illegible] on this view few of us doubt, but our experience as to the alternation versus frequency of the association of the two conditions has not been the same as that of Kraepelin. Either we have not observed [illegible] phases, or Kraepelin has been biassed and has seen slight depressions and elevations which have not been visible to most psychiatrists. From a clinical point of view, especially as to treatment and management, a case of depression is quite different from one of mania, and as we have seen, the prognosis is different. One can scarcely [illegible] telling the relatives of a typical case of simple depression or [illegible] that it is one of 'manic-depressive insanity.' It would obviously be more satisfactory and intelligible to both the medical attendant and to the relations to call it a case of mental depression. The psychological, and especially the emotional, condition in the two varieties is so essentially different and opposite that, even from a [illegible] view, Kraepelin's classification does not seem altogether satisfactory. It is only in the very decided cases, where the depressed and elevated states alternate regularly and have a definite and calculable relationship to each other, that we are bound to regard them as different phases of the same brain condition.

The general prognosis in Kraepelin's manic-depressive insanity is represented, according to my experience, by a 42 per cent recovery rate in the cases treated in institutions, and if we add 8 per cent for recoveries at home, we arrive at a prognostic chance of 50 per cent.

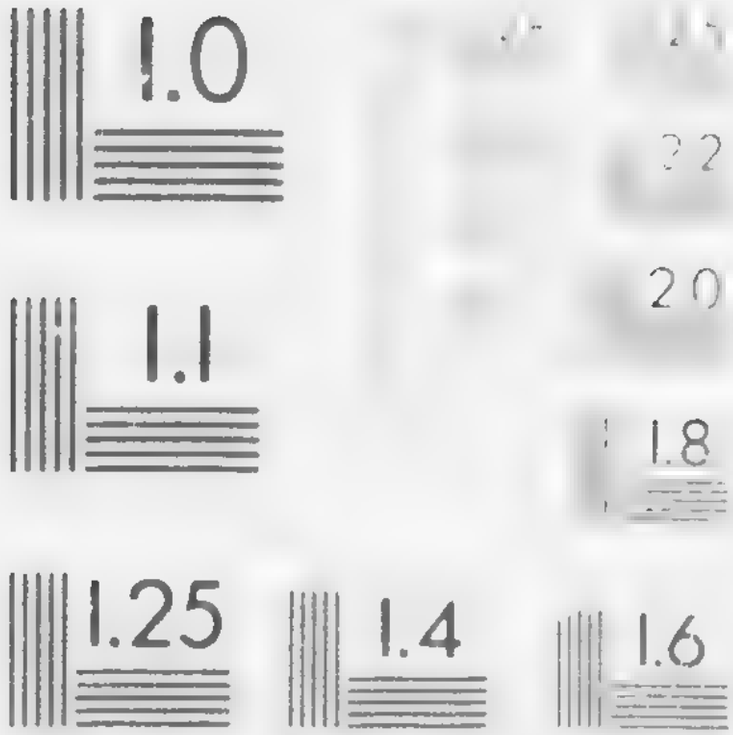
States of Marked and Regular Alternation and Periodicity—'Folie Circulaire.' This is not the place to go into the most interesting subject of the physiological periodicity of function in all living creatures except in so far as it relates to prognosis in mental diseases. The two most marked periodicities in man are sleep and the processes of reproduction. Both are disturbed in mental disease, and disturbances in both markedly affect its symptoms and prognosis. We cannot dissociate the physiological periodicities from the pathological alternations and similar changes in disease. Many recurrences and changes in mental disturbances are accounted for by reference to the physiological periodicities, especially in youth, when we have to do with sex and menstruation. An attack of mental depression or of elevation may be a pathological representation of the physiological effects of menstruation. If we have such a pathological mental periodicity established as a morbid habit, it is very difficult to get rid of, as might have been expected from this relationship to a physiological process. The prognosis therefore becomes bad in such a case.

There is no doubt that when we have a neurotic diathesis and a bad

[illegible]ity we are more apt to have an exaggeration of physio[illegible]ecidities in the direction of disease. Everybody who [illegible] and women from a psychological point of view knows [illegible]ight morning change of mental condition as compared with [illegible] which may be said to be physiological, is greatly exa[illegible] to the neurotic subject, taking the form of a regular morning [illegible]r want of power of energizing, or some vague feeling of [illegible] discomfort. Few men and women of the finer and more [illegible] artistic temperament but experience some such feeling, and [illegible] that simple melancholia often has the same features [illegible]ities of morning and evening temperature are markedly [illegible] the acute insanities. There is no more common symptom [illegible] of recent mental disease than insomnia, which means the [illegible] brain periodicity. Seasonal periodicities exhibit them[illegible] many of the neurotic and the insane. They are not always [illegible] condition of mind in the spring as in summer. Some [illegible] are subject to moods, cravings, obsessions, and tempe[illegible] There are many persons whose mental life is one lo[illegible] of action and reaction, activity and torpor, as if by a natural [illegible] their organization. There are very few of the neuroses, in [illegible] to the mental disturbances, that are not more or less periodic [illegible] neuralgia, asthma, megrim, and, above all, epilep[illegible] a form of mental disease, called *folie circulaire*, first described [illegible] medical authors, in which, when it occurs in a typical form, [illegible] weeks or months, or even, in some cases, years of morbid [illegible] followed by somewhat the same periods of morbid elevation, [illegible] by a condition which is practically sanity. This sequen[illegible] kind of circle with three sections, goes on during the whole [illegible] of the patient in most cases. Once fairly established the [illegible] is extremely bad. In my experience there are not more [illegible] per cent of recoveries. The terminations of this disease, other [illegible] few cases of recovery, are: first, exhaustion during the [illegible] phase of the disease; second, death from old age at the [illegible] of life; third, a sort of settling down into either a milder [illegible] periodicity or into a stuporose condition during old age. Nearly [illegible] undergo this change. Very few indeed of such cases pass [illegible] dementia, however acute the elevated phases may have been [illegible] majority of cases of my 'adolescent insanity' there is a [illegible] remission and periodicity before either recovery or dementia [illegible] and we must be very careful in the diagnosis and prognosis not [illegible] them cases of *folie circulaire*. In fact, we must have [illegible] years' duration and very many successive and regular states [illegible] before we definitely make the diagnosis.

[illegible] suffering from *folie circulaire* usually live long. The acuter [illegible] very troublesome, and usually need institution treatment; [illegible] are many people in the world who have what is virtually a [illegible] form of *folie circulaire*, and during the elevated periods [illegible] only good and sometimes brilliant work, and during the

MICROCOPY RESOLUTION TEST CHART



depressed periods are simply "lazy," stupid, and inactive. They do not need to be put under care at all. I could quote from literature many examples of men who put out their best work during periods of slight mental exaltation.

The favourable indications in *folie circulaire*, in the rare cases where such are met with, are a lengthening in the periods covered by the whole circle, a mitigation in their character, and an improved self-control during the period of elevation, the depression being less intense and the elevation less maniacal. I have been in the habit of trying in the early stages of *folie circulaire* to control and stop the elevation by the use of the bromides, sometimes combined with sulphonal and cannabis indica. I think I can say that in a certain number of cases this has been done and the morbid mental brain habit has been, as it were, stopped. This is worth trying; but I can recall one or two cases where the result of this treatment has been that the patient sank into a kind of lethargy and do not come out of it, ceasing to have any elevations and depressions. On inquiring into family history, we find that cases of *folie circulaire* have nearly always a mental or a neurotic family history. It is found in a typical form more frequently in members of "old" families, and many such families have had other members of great intellectual distinction.

Other Forms of Mental Disease.

Delusional Conditions—Monomania, Paranoia.—Delusion is a term which is not easy of definition. It has a popular and a medical meaning. If any man or woman has a fixed belief in something that would be incredible to people of the same class, education, or race as the person who expresses it, this belief persisting in spite of proof to the contrary, we say he or she has a fixed delusion. If such a delusion continues month by month and year by year, the prognosis is extremely unfavourable. It is only in exceptional cases that such persons recover and do good work in the world. The *finis* in such cases is the character which means the incurability. Such false beliefs and delusions may assume almost every character. They may refer to the patient himself, his health, his occupation and primary instincts, such as sex, food, and social relations, or they may be of a general and impersonal nature, referring to society, to other individuals, to political matters, etc. They may or may not be accompanied by hallucinations of the senses, but if they are so it is a particularly incurable sign. A man's whole mental life may be of a delusional character, or the delusion may refer to one subject alone, being then called monomania. Delusional conditions are usually divided psychologically into two kinds, one of elevation and other of depression, happiness, the other of persecution, suspicion, unseen agencies, and irritability, danger, and general unhappiness in life. Delusional insanity is often founded on the temperament of the individual. Vain men fall into the delusion that they are much more able or hold higher positions than is the case. Suspicious men

[illegible] that their relatives and friends or society are persecuting

[illegible] psychiatrist, when he is consulted about a case where [illegible] tendency to insane delusion, or where there are hallucinations [illegible] origin, first looks out for some bodily cause of this brain and [illegible] change. He endeavours to ascertain whether there is any [illegible] dating in the brain from without the body or from within. [illegible] of the common results of the excessive use of alcohol to find delusions of suspicion and hallucinations of the senses. The syphilitic poison often produces the same result. I believe the toxic effects of [illegible] down on tubercle bacilli in phthisical patients sometimes [illegible] mental disturbances through their action on the brain cells [illegible] tion which I have called "phthisical insanity." There is a [illegible] well-known form of mental disturbance, liable to occur during attacks of acute rheumatism, which is undoubtedly caused by [illegible] matic poison or micro-organism. There are also the myxœdematous and exophthalmic forms of mental disturbance. I would advise every medical practitioner not to come to an absolutely unfavourable prognosis in cases of delusional insanity before he has made [illegible] investigation into such possible bodily causes of the disease [illegible] the chances of counteracting or getting rid of them [illegible] toxins may have the effect of damaging the brain cells irre[illegible] but in some cases of delusion they may be counteracted, [illegible] that way the patient cured if taken in time. Of recent years [illegible] our younger psychiatrists have been trying the effects of [illegible] sera and vaccines, used in the early stages of such cases, as [illegible] counteractives, but their success has not as yet been great. [illegible] field, however, from which we hope much in the more acute [illegible] but I cannot say that in the cases of paranoia there has been [illegible] success except in certain cases of syphilitic origin, and then [illegible] marked benefit, and even cure, by the use of antisyphilitic [illegible] combined of course with moral and mental treatment, occupa[illegible] changes of environment, etc. There are now a considerable [illegible] of cases on record where a condition of fixed delusion was [illegible] by traumatic injury to the head, and where surgical operation [illegible] cured the disease.

[illegible] legal aspect of insane delusion, as there may be in most [illegible] mental disease, where we have homicide, suicide, and serious [illegible] done as the result of delusions. It is often important [illegible] to give evidence that such cases are the result of mental [illegible] There are a certain number of the cases of paranoia where [illegible] are concealed, and their presence is even consistent with [illegible] positions of responsibility and doing good work in the world. In such cases the prognosis specially applies where wills are made and [illegible] by the delusions present in the patient's mind. I have [illegible] frequently consulted about persons with delusions who have exhibited them to no one except their nearest relations.

Magnan, of Paris, has described what he terms a "progressive

[illegible] delusional insanity, characterized by four stages: [illegible] interpretations and [illegible] delusions. (2) Ideas of persecution with hallucinations of hearing. (3) Delusions of grandeur. (4) Dementia. My experience is that this [illegible] case, which [illegible] is [illegible] as part of that degeneracy and hysteria [illegible] Max Nordau so vividly describes, a [illegible] can possess the [illegible] and art. It is [illegible] and where it exists it is certainly an [illegible] human temper.

Defective Control, Insane Impulse, Insanity without Delusion Exaltation, Depression, or Enfeeblement. There can be no doubt that man's power of self-[illegible] and his ability through the exercise of his volition to regulate his conduct so that he lives within the limits of the law and of good morals, is his highest faculty. When this great power fails in a marked degree and men and women act from pure unreasoning impulse, and especially if such action is sudden and explosive, it undoubtedly means disease. Under the influence of uncontrollable impulses suicide and homicide are sometimes committed, and many crimes and antisocial acts result. Such loss of weakness of the power of mental inhibition must, however, be very marked to class it as a disease. Almost all control in all persons is a question of degree. Mental inhibition is a faculty which does not exist in early childhood and it grows during childhood and adolescence just as the bodily powers and faculties develop. A careful study of different children shows that there is an extraordinary difference between the degree and the development of this power in different children of the same ages. That development, or should be, associated with a growing sense of right and wrong, and of duty in regard to parents, relatives, society, and the Almighty. There are cases where such power of inhibition and such a sense of right and wrong is never developed [illegible]. We now call such "mental inhibitivity," and for the first time the sense of it has lately been recognized in British Parliament, and statutory provisions are now proposed for the care of such persons, just as we have earlier provisions for the care of the insane. The Royal Commission on the Care and Control of the Feeble-minded thus defined such mental inhability: "Persons who, from an early age, display some mental defect, coupled with strong vicious or criminal propensities, on which punishment has little or no deterrent effect." It will be observed that the words "mental defect" are used by the Commission, and it is quite true that there is a real mental defect, which in most cases, invariably [illegible] and the conditions, but there is a combination of lack of will power and moral sense in a few grown up men and women without any mental impairment. Some such are [illegible] criminally [illegible] and are [illegible] to the detriment of society. They have been called "born criminals" and "habitual and instinctive criminals." Most [illegible] for society and persons in [illegible] Where this condition of [illegible] and [illegible] after a careful inquiry and after allowing for the effects of bad environment,

[illegible] and no mental teaching its subjects may be pro[illegible] incurable. Sometimes forcibly segregate them as [illegible] proposed in the Report of the Commission I have referred to [illegible] only some of insane character.

[illegible], *etc.*—The most common, and the most troublesome to [illegible] uncontrollable impulses and moral defects, is that of [illegible] alcohol, opium, cocaine, and such drugs. There have been [illegible] dipsomania, 'morphomania' etc. These are many forms [illegible] some of which are curable, but the true dipsomania [illegible] some cases out of a hundred, an incurable malady. It is [illegible] case. It is often recurrent and periodic in its exceptions, and [illegible] pathological study of a number of cases has led me to physi[illegible] of among the number, to the conclusion that one usually [illegible] with the drink craving more or less of a real mental [illegible] character, in intellect, and common sense as well as [illegible]. The effects of the excessive use of alcohol have been so [illegible] to society that many Government Commissions have been [illegible] to investigate the causes and to suggest remedies, while books [illegible] number by doctors and laymen have been written on the [illegible]. I was lately a member of a Departmental Committee which [illegible] the subject of inebriety and its social consequences. We [illegible] witnesses who had had every sort of social experience. [illegible] impressed with this fact, that the opinion of the public [illegible] matter is now so advanced that we could get no witnesses to [illegible] the thesis that the principle of the liberty of the subject should [illegible] when we have to deal with certain forms of inebriety. [illegible] distinguished witnesses from the legal profession, whose duty it [illegible] the liberty of the subject, admitted that some statutory [illegible] must be made to control persons suffering from dipsomania [illegible] kinds of inebriety. I feel the legislature finds time and [illegible] on to pass such measures, the progress of such diseases [illegible] hopeless. The exceptions of recovery only prove the rule [illegible] exceptions, in my experience, apply only to such cases, and they [illegible] few, who lose the drink craving at about the age of thirty or [illegible] sort of physiological change which has taken place in [illegible] action at that time; but even when they recover, they [illegible] usually good for much as citizens. I shall speak of the [illegible] of alcoholism—an entirely different disease from dipsomania [illegible] in

[illegible] which defective inhibition, insane impulse, and explosive [illegible] may take are innumerable—destructive [illegible], incendiarising, [illegible], kleptomania, suicide, homicide, etc. The medico-legal [illegible] of these tendencies is extremely important, and we must [illegible] be prepared to state on oath in the courts our views of [illegible] is in reference to them. Regarding them as a class the [illegible] is unfavourable.

Conditions of Mental Confusion and Stupor.—I have already [illegible] to the stuporose conditions as sometimes forming a part of

the sequence of clinical symptoms in melancholia, but there are conditions of stupor and confusion, not associated with melancholia or mania, that form of themselves a symptomatological group of mental disease. A certain amount of confusion may be present in almost any form of insanity, but it may also exist *per se*. Typical cases of stupor are characterized by negative symptoms. There is no exhibition of active mind at all present, there is no mental reflex as the result of any mental or bodily excitant, and there are many bodily symptoms which show that the higher brain cells are almost in a condition of suspended function.

There are certain striking bodily symptoms in typical cases of negative stupor which are always of importance in prognosis. The circulation is very disturbed, so that the capillaries have lost their tone, the extremities look blue and feel cold, the whole action of the central nervous system is, to a certain extent, lowered and devitalized, the ordinary motor reflexes are sometimes almost abolished, and the general effect is very alarming to the non-medical mind. The relatives think that a person in such condition is pretty sure to die. The voluntary motor system is found to be in three conditions in different cases: (1) Passive and unresistive ('anergic' stupor): (2) Cataleptic, with a decided tendency to keep fixed attitudes, and the muscles 'waxy': (3) Resistive, so that a strong resistance is made to change of positions to walking, etc. Now none of these necessarily means a bad prognosis. They may be all recovered from in time and with proper treatment. Most of the cases of stupor occur before the age of thirty. They are sometimes mixed up with hysterical symptoms. In the cataleptic and non-resistive condition there is no expression of the face or eye whatever. In many of the resistive cases there is a marked melancholic expression. It has been called *melancholia attonita*. While many of the cases result from purely bodily causes of exhaustion, many of them are also the result of terrible mental shocks.

A few of the cases of stupor die, in spite of all treatment, of exhaustion and inanition. As a group, however, they recover in the proportion of 50 per cent, but there is an unfortunate tendency in about 30 per cent to pass into dementia, and those Kraepelin would call *dementia præcox* (*see p.* 475). Stupor sometimes occurs as a phase in cases of mania or melancholia; and at the end of a prolonged attack of acute mania, in a young person, there may be a stage of stupor which may closely imitate true incurable dementia. One must be careful not to give an unfavourable prognosis in such cases.

Some authors use the term 'primary dementia' to describe certain cases of stupor. I altogether object to the use of the term 'dementia' except to describe incurable conditions of mental enfeeblement. It is also sometimes called 'confusional insanity,' but confusion requires to be present in an extreme degree for it to be called stupor, although psychologically and physiologically the two conditions have a close relationship, and the one may be simply an aggravated degree of the other. In some few cases of stupor we may have sudden, automatic,

[illegible] impulses or explosions, like a mental epilepsy. Such [illegible] not necessarily indicate a bad prognosis.

States of Mental Enfeeblement; Dementia.—While the term [illegible] enfeeblement' may be used in a semi-popular sense, the [illegible] should only be applied to a condition of weakness of [illegible] to memory, power of attention, interest in the outside [illegible] reasoning and of emotion, these in by far the larger [illegible] of cases occurring as a secondary condition to some more or [illegible] form of mental disease. Mental exaltations, especially acute [illegible] are the most common preludes to a condition of dementia; but [illegible] very few cases where slow, progressive enfeeblement occurs [illegible] people, just as senile dotage slowly draws on as a physio[illegible] process. Formerly we were apt to think that the cell damage, [illegible] by toxins, and in acute mania, produced a state of damage in those cells with a tendency to atrophy; but further study of the subject has shown that the primary state of morbid exaltation and the secondary condition of mental deterioration and cell-death are [illegible] parts of the same process and are the result of a possible toxæmia [illegible] strong hereditary tendency towards mental disease. We find that by far the greater number of cases of dementia occur as a sequel [illegible] a part of adolescent insanity, occurring before the age of twenty. [illegible] I have sometimes called it a 'postponed imbecility.'

Unfortunately in secondary dementia the prognosis is always bad [illegible] patient in fact cannot recover, because 50 per cent of the higher [illegible] in the higher and anterior parts of the cortex have undergone a process of atrophy or degeneration, as can now be demonstrated microscopically. Dements may live for a long time, in the less marked [illegible] even to an extreme old age; but there is always a tendency for [illegible] to be unduly unresistive to the ordinary causes of disease and [illegible] In the older mental hospitals, where there was overcrowding [illegible] perfect ventilation, and where the diet was not as carefully attended to as it is now, 30 per cent used to die of phthisis pulmonalis. [illegible] many cases of secondary dementia the 'stigmata of degeneration,' [illegible] ch I shall presently allude as being present in congenital enfee[illegible] are found.

Conditions of Congenital Mental Weakness; Amentia.—In the [illegible] of growth and development of the brain there is liable to occur [illegible] arrest, either in utero, or in the first five years of life. This results [illegible] mental enfeeblement, an incapacity for education, and most [illegible] ently also in changes in the normal appearance, strength, and [illegible] of the body generally, or in some of its chief organs. Of recent [illegible] conditions have attracted great social attention, and have [illegible] subject to an inquiry by a Royal Commission, as previously [illegible] By scientific observers, conditions of idiocy and congenital [illegible] tal defect have been classified in various elaborate ways, etiologic[illegible] anatomatologically, and pathologically. Several observers, especially of the Italian school, have been inclined to put down a considerable proportion of them to ante-natal toxic conditions. Th[illegible]

[illegible] undoubtedly appear in [illegible] there has not yet been [illegible] to [illegible] the [illegible] for the [illegible] of cases. The Royal Commission to which I have referred [illegible] these patients as

1. *Idiots*, — persons so deeply defective in mind from birth, or from an early age, that they are unable to guard themselves against physical dangers, and are in the case of young children [illegible] their parents from [illegible] them alone.

2. *Imbeciles*, — persons who are capable of guarding themselves from common physical dangers, but who are incapable of managing their own living, by reason of their defect existing from birth or from an early age.

3. *Feeble-minded*, — persons who may be capable of managing a living under favourable circumstances, but are incapable, by mental defect existing from birth or from an early age, of competing on equal terms with their normal fellows, or of managing themselves and their affairs with ordinary prudence.

To these I add a fourth class, *moral imbeciles*, the class of which I have already spoken.

This classification is, as will be readily seen, largely founded on administrative grounds, for the purpose of enabling the legislature to adopt different measures and to provide different kinds of institutions for these classes of defectives.

Looking at the whole class from a prognostic point of view, it may be said that they are all incurable. Idiocy is not only incurable, but is only improvable to a limited extent, in regard to the habits and ways of the patients, by placing them in institutions and by special treatment. Their lives may thus be rendered somewhat more human than if left alone, and undoubtedly may be prolonged. As showing the fact that, in this condition, not only the brain and mind are defective but the whole nutrition of the body is weakened, it is found that about two-thirds of all the idiots are subject to, or die of, tuberculous disease. The second class, the imbeciles, are educable, in special institutions and by special means, to a considerable extent, but there is a limit to this, and all their lives they will require to be cared for by others. It is now proposed to provide special institutions for such cases at the public expense, as a great philanthropic measure, for all of them who have not means to provide it for themselves. Undoubtedly the imbeciles may be enabled to lead a happier life and to live longer through such special care. The third class, of the "feeble-minded," often called "defectives," have attracted more public interest than the other two classes, because they are neither ordinary lunatics, and some of them exhibit special capacities, e.g., in music and mechanical work, to a strange degree from even average humanity. There is a great social and eugenic question connected with this class also, namely, the risk of their propagation, the liability of some of the female defectives to fall into the ranks of prostitution, and other social and moral risks to which society is liable through their sex stamen. The educability of many of them, during childhood and youth, is such that

[illegible] be made self-supporting members of society, but always [illegible] supervision. None of them can ever attain the position of [illegible] citizen. The whole question of prognosis is [illegible] up, [illegible] of congenital enfeeblement with [illegible] and [illegible] on their special behalf, and improvement can only [illegible] at the best in the great majority of cases. [illegible] cases [illegible] really restored to mental capacity are those resulting from [illegible] pathological conditions, capable of recovery and cure, like hydro[illegible]cephalus and traumatic injury to the brain.

[illegible] *Degeneration.* There are certain kinds of bodily and [illegible] abnormalities that are found in most congenital cases, which are [illegible] tance, both in diagnosis and in prognosis. These have been [illegible] stigmata of degeneration.' They assume innumerable forms. [illegible] of the head may be so altered that they make it abnormal [illegible] and so alter the expression of face, producing the effect of [illegible] Malformations of the hard palate are the most frequent [illegible] bodily stigmata. It may have a 'V' shape or a saddle [illegible] it may be cleft. The teeth may alter in their number or [illegible] disposition; the bones of the thorax may be affected so that [illegible] pigeon-breast. The fingers may be short or irregular; the [illegible] may be of that shape that we now call 'neurotic.' There may [illegible] supernumerary fingers or toes, or club-feet. The organs of special [illegible] especially the eyes and the external ear, may be abnormal; [illegible] asymmetry or attached lobes occur. The angle of the eyelids may [illegible] as to produce a Mongolian appearance. The heart, the [illegible] the bowels, the tongue, the genito-urinary system, may be all [illegible]. There may be a general arrest of bodily function producing [illegible]tism' and dwarfishness. The general power of expressing [illegible] in the face may fail. Certain mental stigmata also are liable to appear. Arrested, or postponed, or unrelational development of the mental faculties is common. Speech may be defective or postponed [illegible] on. The power of reasoning may not be absent, but so [illegible] that the victims are never able to draw right conclusions [illegible] premises, however obvious they may be. There are cases where [illegible]mory is so prodigious that whole pages of a book can be repeated [illegible] reading it. Many cases of an abnormal power of calculation [illegible] record. All these things give a bad prognosis in any case. They are found, but not so frequently, in some cases of adolescent insanity, [illegible] are extremely common among developmental epileptic [illegible]

Cretinism—Thyroid.—There is one class of imbecile children where [illegible]gnosis is not always unfavourable, viz., the cretins, and those [illegible]om the thyroid gland is affected in its functions. Many of these [illegible]ther cured or markedly benefited by the administration of thyroid [illegible] Many physicians now try thyroid administration experiment[illegible] whenever they have an idiot or imbecile to treat, and occasionally [illegible] improvement is thus attained.

General Paralysis.—We now come to one of the most interesting [illegible] forms of combined brain and mental disease—general paralysis.

Its prognosis has this profound interest, that while as yet there [illegible] almost infinitesimal record of recovery, there is a strong feeling [illegible] on the facts of its etiology and of the results of recent developments in [illegible] and other treatment, that its cure will become possible when our knowledge in regard to it still further increases, and that it may be prevented by an early cure of all cases of syphilis.

The chief difficulty in this disease is not its prognosis, but its [illegible] diagnosis in the early stages. In addition to the well-known [illegible] symptoms of the disease, the Wassermann reaction has now taken a definite place as perhaps the most important of all in connection of the diagnosis. The disease may now be said almost definitely to have syphilis as its predisposing cause. Whether there is not another and proximate cause in syphilized subjects to account for the disease is as yet in doubt. Considering that it only occurs in from 2 to 4 per cent of those who have acquired syphilis, and that it is not amenable to antisyphilitic remedies, it seems to me that there must be another etiological element, probably in the shape of some specific micro-organism. Dr. Ford Robertson, who has worked long and arduously at this subject, is of this opinion, and he believed, at one time, that a form of diphtheroid organism, which he called the *Bacillus paralyticus*, was the proximate cause of the disease; but this has not as yet been confirmed. He has certainly been able to produce a morbid condition of the brain in some of the lower animals which, in symptoms and pathological appearance, closely resembles the disease, by inoculating injections of cultivations of bacilli from general paralytic patients.

The duration of general paralysis, from its beginning, varies from a few months to over twenty years, but the average duration of life is a little under three years. One of the great things to remember in general paralysis is that no prognosis is justifiable until the disease has been definitely ascertained to exist. Further, there must be a combination of mental and bodily symptoms present. Certain mental and bodily conditions closely resembling general paralysis, produced by alcohol, syphilis, epilepsy, trauma, organic brain disease, acute mania, and chorea, must be eliminated before any diagnosis or prognosis is come to.

There are certain symptoms which at present usually mean a short duration of the disease. These are extreme acuteness of symptoms at the onset, congestive attacks, and rapid development of the three stages one after the other. There are other symptoms which indicate that the case will probably last long. These are a slow, insidious onset of mental enfeeblement, freedom from maniacal symptoms with ambitious delusions, the prolongation of the first stage, and the occurrence of what appear to be remissions in the course of the disease.

We now recognize that, in addition to the classical three stages of the disease, there is a preliminary or prodromal stage, but the symptoms of this are as yet so uncertain that we must on no account give a bad prognosis because of any such apparent prodromal symptoms. The application of the Wassermann test will, however, in the future help

[illegible] to the prognosis by determining the character of [illegible] cases. The great hope for the future in regard to [illegible] is that it will be altogether prevented by the early [illegible] in all cases.

Syphilitic Mental Symptoms.—There are conditions of mental [illegible] to the direct action of syphilis on the brain, its membranes, or its vessels, apart from general paralysis. The [illegible] nature of such cases, as a rule, fairly good if treated in [illegible] in these cases, rather than in general paralysis, that syphilis [illegible] in accordance with treatment, and the Wassermann reaction [illegible] of diagnosis. If mental symptoms occur during the second [illegible] of the disease, they are, in nearly all cases, curable under the [illegible] treatment of the disease. These secondary mental symptoms are, however, very rare. The most common form of syphilitic insanity [illegible] various forms of vascular disease. These may occur in [illegible] degree. Sometimes they are extremely localized. Usually they [illegible] their course. They are very difficult to diagnose during the [illegible] stage, which is undoubtedly the most curable. If we have marked [illegible] paralysis, indicating serious damage to the motor centres, the [illegible] may be arrested, but we can seldom hope for cure. In such [illegible] I have frequently known the patient recover in regard to his [illegible] condition, but still remain more or less paralytic, and live for [illegible] years. The occurrence of convulsions, which usually take the [illegible] of Jacksonian epilepsy, does not necessarily indicate a bad prognosis if proper treatment is adopted. I can recall a case where, as a [illegible] case, the patient had both slight local paralysis and Jacksonian [illegible] but who lived for fifty years and did good work during most [illegible] of that time. There was no progression of the symptoms in his case. [illegible] there was a form of what I believe to be syphilitic insanity which [illegible] at [illegible] and often for many years, no bodily symptoms except [illegible] of hearing, the mental symptoms being morbid suspicions [illegible] tendencies to impulsive violence. If such cases are diagnosed [illegible] treated by anti-syphilitic measures very early, I have seen recovery [illegible] place, but if really established, the outlook is very hopeless, [illegible] an ordinary case of delusional insanity. Such cases usually [illegible] a bad hereditary, and the syphilitic brain poisoning seems to light [illegible] his tendency into actual mental disease, just as an excessive use of [illegible] might have done, without causing very marked damage that [illegible] be detected microscopically after death.

[illegible] a few cases of acute mental disease resulting from syphilitic [illegible] from gummata causing pressure, taking the form of [illegible] convulsions and acute mania. This, if detected early enough, [illegible] to treatment by the iodides in very large doses. The risk [illegible] however, very great.

[illegible] actual number of cases of syphilitic mental disease is very [illegible], as my experience being only 0·5 per cent out of 2145 cases [illegible] mental disease altogether. No doubt in minor forms, treated [illegible] outside institutions, it is much more common; and with

[illegible]

[illegible] Alcoholic Mental Disease.

[illegible] **Delirium Tremens.** [illegible] at least 80 per cent of the cases. [illegible] dying, and either [illegible] passing into the more prolonged [illegible] with [illegible] and undoubted chance of recovery.

It is now stated by recent authors on alcohol [illegible] that delirium tremens should be prevented altogether. If proper measures are taken when it is threatened or when its symptoms first appear. Hare calls delirium tremens [illegible] distinct symptoms and he believes Launey's theory that the cause is a hypothetical substance called an "anti-alcohol." He strongly advocates its abortive treatment. This is carried out by not depressing the patient or disturbing his sleep, and giving it either by the stomach or by inhalation with oxygen carried out this treatment with adequate quantities until the patient begins to improve. He states that not only is the disease better treated, if aborted in this way, but the risk of death is less, and the risk of such complications as pneumonia is much less met. I should like to see the term delirium tremens abolished and "acute alcoholism" substituted for it. Patients not only recover from the disease but Hare says, there is little risk of relapse, unless alcohol is again taken to, which, most unfortunately, is very apt to be the case. When the temperature falls, and the power of sleep is restored, the patient may be pronounced on the way to convalescence.

Mania a Potu. This is really a transitory alcoholic delirium to which patients of a certain neurotic type of brain are subject from a bout of drinking, or, in some cases, from even small quantities of alcohol. It does not imply previous alcoholic habit, and its symptoms almost invariably pass off in a few days. Its occurrence means that

Chronic Alcoholism.

Alcoholic Dementia and Degeneration.—Patients who have [illegible] to a diminished power of initiative and action and

especially to defects of memory that are very characteristic. The expression of the face and eyes are altered and deteriorated, and the man is not at all "the same" as he was. There need not have existed in such cases, any previous form of acute alcoholic insanity. I need hardly say that this condition is entirely hopeless in regard to prognosis, and the older the man is, the worse the outlook. Sometimes the condition seems to hang on a little longer prematurely. The brain cells are hopelessly degenerated.

"Respectable" Excess.—To anyone who is accustomed to observe carefully the expression of face and the intimate psychology of some of his friends and acquaintances who take much liquor, there are many mental degenerations to be seen, as the result, not of constant drunkenness, but of what has been really excessive habitual use of alcohol, though it may not have been counted very immoral. They are "respectable" drinkers. The first traits of mind and character get lost. There is an concentration of the mental tone, a lack of energy and activity in life, selfishness and egotism are seen in too marked a degree. Now in the very beginning of this consideration, I can fancy prudent friends and a firm doctor, so that he is persuaded to abandon entirely the use of alcohol, to take a great deal of exercise, and resort to outdoor pastimes. These suspicious symptoms may entirely disappear and the man may become the old self. I have seen many such cases.

I have already treated of *Kleptomania* as one of the forms of defective inhibition.

Morbid Cravings for Various Drugs.—Opium, chloral, cocaine and various other drugs of the nerve stimulant or nerve sedative type may be taken to such excess that they become a morbid habit and virtually forms of mental disease. It may be said that as regard to most of them the habit may be broken and the patient cured for the time being, but only through outside control and special treatment. The patients are not able, on their own account, to cure themselves and abandon these drugs. The opium habit is the most common, and if long continued is more liable to end in death than any other, through stubborn retention and incapacity to receive food. My experience, however, is that the cocaine habit is really the most difficult to break, and the most apt to return. Cocaine is, in fact, the most fascinating and the most powerful destroyer of human inhibition of any substance known to us. I have seen a complete cure of the opium habit after thirty years' duration. I have never seen a cure of the cocaine habit at all. Special institution treatment is necessary in by far the majority of cases of the drug habit, though, where the means allow, a doctor's house or a home with special nursing may be effectual.

The prognosis in the opium habit depends on (1) The patient's resolution to undergo treatment; (2) His response to treatment in the early stages. During the natural tapering downward the drug, which is the method now always practised, there is intense misery and prostration. If the sickness, diarrhœa, and consequent exhaustion are extreme, the patient may die, or the treatment may, even, in a few cases, have to be stopped to save life.

The Mental Symptoms of Organic Brain Diseases.

[illegible] of apoplexy or hemiplegia, especially those in advanced [illegible] almost invariably accompanied by mental symptoms. The [illegible] occurs as the result of tumours, atrophies, and many cases of brain degeneration. These symptoms sometimes take the [illegible] "enfeeblement" but in essence they are an enfeeblement [illegible]. We find, in a large number of such cases, an emotional [illegible] [illegible] exaggerated irascibleness, loss of well power, [illegible] diminished [illegible] and a lessened mental energy. These symptoms do [illegible] constitute an insanity in the popular sense. The [illegible] exceptions are apt to be transient. In the early stages of most [illegible] cases, and more those of enfeeblement in the late stages [illegible] paralysis with softening of the brain. If we take an [illegible] of one of the smaller brain arteries in a young person, it [illegible] local paralysis almost without any mental symptoms [illegible] few weeks, and the same is seen in syphilitic vascular [illegible]. Judging the statistics of the Royal Edinburgh Mental Hospital [illegible] years 1871–1882, we had out of 3445 admissions 91, or [illegible], of this kind of mental disease, which means that the mental [illegible] in these years of a marked type. Of these 91 cases 17 or [illegible] 19 per cent. recovered. I do not say that in the recoveries [illegible] that the subjects of them were not hemiplegic in [illegible] but this favourable result, I confess, surprised me. I had [illegible] considerably less "recovery" rate. The treatment really [illegible] proper nursing and non-stimulating diet, and at the present [illegible] within the first month, his chances of at least a partial mental [illegible] very good, but it will probably be slow. The patient's age is the most important thing in forming the prognosis. It has been [illegible] that there are signs of arterial degeneration, it is bad.

Epileptic Unsoundness of Mind.

[illegible] of the manifestations of epilepsy unfortunately serves it to [illegible] with mental disturbances or mental defect in a very large [illegible] of cases. These disturbances and defects assume a great [illegible] forms, and their degrees and intensity are strikingly different. [illegible] purposes we have to divide epileptic unsoundness into [illegible]: (1) Mental defect as an almost universal accompaniment [illegible] disease when it occurs before seven years of age; (2) [illegible] and disturbances when they arise during the development [illegible] period between seven and twenty-five years of age, the largest [illegible] of cases occurring during this period, and the most typical [illegible] being then seen; (3) Epilepsy occurring in the full [illegible] and senile periods.

[illegible] defects in the first period are those of mental deficiency from [illegible] development of the brain, and the prognosis is the same as [illegible] and imbecility. It may be said to be hopeless at the fit age [illegible] and regular in course, but there are a few cases of considerable

of the intellectual and moral character at that period of life when the mental faculties are not very solidly established or developed. The epilepsy of this period of life is, in most cases, preceded by acute abnormalities and stigmata as I have described above. We find on the mental defects, the bodily stigmata, and the fits, as being all effects of the common factor of arrest in brain growth and development. As a matter of fact, however, the accompanying epilepsy is a very unfavourable factor as regards education and improvement in the mental condition, either when carried out under the care of special teachers in institutions or at home. Any improvement thus attained is apt to be arrested and put back by the frequent occurrence of the fit.

The second form of epilepsy now to be dealt with is that in which mental defect is absent, the fits, especially where the cause is not a disease, but the general tendency is towards mental deterioration, which has continued and there is always a danger of conditions of mental overturning, either of a very severe type, and of delusional character, connected with the fits. The prognosis is not absolutely bad for men and women are met with, who have occasional spasms, fits during many years, or during the whole life time, without any attempt at homicide, assault, or even marked mental disorder. Education work is quite not to be done in these cases, but a careful study of the character and whole life history of the epileptic when possible, is apt to result in the conclusion that even in these there are apt to be slight abnormalities in the motions and character. The occurrence of epileptic fits at very rare intervals may, however, be consistent with great mental power, and even with genius. It is usually said, but the statement lacks definite scientific proof, that Julius Cæsar, Mahomet, and Napoleon were subject to such attacks.

The mental symptoms in primary epilepsy usually occur after an attack or attacks. In such cases the symptoms are acute and are often very serious, sometimes with attempts at homicide. The epileptic maniac is an extremely dangerous person. These acute mental symptoms commonly occur within twenty-four hours of the convulsions. There are many epileptics who are subject to mental disturbances as a prelude to the fits. These show themselves a day or two before the convulsions occur, and, in many cases, the mental symptoms cease apparently as the result of the fit. There are a few cases where a mental disturbance will, as it were, take the place of the fits; this is the mental epilepsy, the false consciousness, the *épilepsie larvée* of the French. If epilepsy persists year by year there is almost always a mental deterioration, a loss of memory, a change of affection, a blunting of the finer feelings, a morbid egotism and selfishness, all these symptoms getting worse as time goes on. This is, in fact, an epileptic dementia. The prognosis in this second class of epileptics is extremely bad in regard to complete recovery. Attention to the health and diet, distinction from alcohol, a certain life of work in the fresh air, and a steady use of the bromides in suitable cases, will undoubtedly in most cases

diminution in the number of attacks and an enormous [illegible] for the better of the acuter mental symptoms. I used [illegible] the Royal Edinburgh Asylum, a steady average of thirteen [illegible] sent to the institution every year, and about forty constant [illegible] and after I put the greater number of them on constant [illegible] from 25 to 50 gr. of bromide of potassium every twenty-four [illegible] acuter forms of epileptic mania practically ceased, and I [illegible] ten years, out of 115 admissions, I discharge 22, or 19 per [illegible] recovered mentally. This gives, however, too favourable [illegible] result, because, if the patient who has been certified as [illegible] institution remains mentally free from technical insanity [illegible] months, although he is still an epileptic and subject to [illegible] weeks, we must legally discharge him as recovered from his [illegible] case, and many of the recoveries were contingent on patients [illegible] ng the bromides, which, by the way, it is extremely difficult [illegible] d out when a patient feels himself pretty well and does not [illegible] ts for a certain time. Statistics show that 51 per cent of [illegible] cases comes out before fourteen years of age, and 95 per cent [illegible] twenty-five. This fact clearly shows its definite relationship [illegible] period of life and brain development. The Royal Commission [illegible] which I have alluded gives some statistics in regard to [illegible] It quotes one estimate as being one sane epileptic per [illegible] of the population. This would make the number in the [illegible] 15,216, but another investigator gives the number as only [illegible] England and Wales. Such a discrepancy shows that these [illegible] are unreliable. The estimate of the Commissioners in regard [illegible] epileptics in asylums and workhouses, or in the general [illegible] is that their number amounts to one in ten thousand, or [illegible] In actual matter of fact there are 11,078 epileptics out of [illegible] population in the county and borough asylums of England. [illegible] ate is that there are 100,000 epileptics, sane and insane, in [illegible] Britain and Ireland. The prevalence of epilepsy in different [illegible] and districts of England differs enormously. It may be said [illegible] those agricultural counties of England which are largely beer-[illegible] drinking, the proportion of epileptics in the mental hospitals [illegible] greater than in the manufacturing counties and large cities, [illegible] nts to 11 per cent of all the admissions to county asylums. [illegible] cities of England they amount to 8 per cent, and in Scotland [illegible] per cent of the admissions. It is a curious fact, as illus-[illegible] the possibility of treating epileptics and epileptic insanity at [illegible] in private houses, where there are sufficient means, that [illegible] ction of epileptics among private patients in mental hospitals [illegible] sly less than among the rate-paid class of insane.

[illegible] ed to the third class of epileptic insane, where the disease [illegible] on after twenty-five years of age, which amounts to 5 per [illegible] total number, it is, to a large extent, the result of excessive [illegible] traumatism or vascular disease in old age. The prognosis [illegible] such cases is more favourable than in the cases just here

occurred before twenty-five. I have no actual statistics, but I would give it at about 30 per cent. Treatment has been by great one.

In dealing with the prognosis of epileptic mental disease, one must take out of account the fact that most epileptics are exceedingly apt to have an uncontrollable craving for alcohol, and that, under the influence of alcohol, they become far more dangerous and homicidal. It is well known that of the number of homicides committed in the country, a certain proportion of the murderers are epileptics. Any medical man having an epileptic to treat should certainly point out this note of possible danger in every case.

Mental Disorders Associated with Childbirth.

The mental affections connected with childbirth have been naturally classified into those which are liable to occur during pregnancy, those which occur soon after, and as the result of, confinement, and those that occur during nursing.

Puerperal Insanity. By far the most important and the most frequent of these is puerperal insanity, which term is somewhat arbitrarily restricted to apply to cases occurring within the first six weeks after delivery. This does not present the same symptoms in all the cases, but the largest number, and most well-defined type, consists of those occurring within the first fortnight after delivery. This type is about the simplest form of mental disease we meet with, and the most definite. Anxiety, exception, general paralysis. The temperature is fairly rising, sometimes to 100. The pulse is extremely weak and thready. The patient looks extremely exhausted, the bodily organs, the kidneys, are not to be depended on, the eyes are bloodshot, and the body is covered with a fine exanthematous and abundant rash. The mental symptoms are of the acute type. The attention caused by the patient is in a condition approximate delirium. She takes no notice of food, has to be induced to take it, has violent and fierce moments, has to be held in bed, she will not have food, and above all, which is the marked symptom, she can conceive no mental disease, she thinks she is quite well, and above all, she is in a state of great exhaustion, and is liable to succumb to it, perhaps at a further case late. Now, this condition is treatable, a fortnight ago we thought that it was difficult to know if it was not of that character. For an epidemic has been said of it, though experienced and other eminent authorities have been [illegible] for the [illegible] some recent authors discuss the exhaustion. Looking at it from a clinical point of view, since we have [illegible] in the period of some five years, [illegible] to recovery as [illegible] good. The prognosis most of those within three months, but the recovery is not complete, not [illegible] to relapse. But there is one distinct risk in such cases, and [illegible], especially when the temperature [illegible] 102°. The death rate in these amounts to over 10 per cent. M. [illegible] the risk of death is found in the temperature [illegible] the risk of death is found in the temperature [illegible] complicates.

I have found that over 80 per cent of such acute cases recover, [illegible] subject to intercurrent diseases—septic inflammation of [illegible] and its surroundings, meningeal inflammation, and [illegible] pelvic abscess. As might have been expected, hereditary [illegible] is a predisposing cause of mental disease after confinement, [illegible] in most other cases.

There is a type of puerperal mental disease of a milder type than [illegible] I have described, constituting about one-half of the cases. [illegible] the symptoms are all milder, without much tendency to an [illegible] high temperature, and with the risk of death [illegible] [illegible]. These recover in the proportion of about 70 per cent, [illegible] of them running on into chronic insanity and dementia. They [illegible] recover quite so quickly as the very acute cases of the disease, [illegible] requires six months to get better; but on the milder, as in the [illegible] cases, the risk of the mother injuring the child has to be kept [illegible] in every case, and the nerves and relations must be [illegible] [illegible] that point.

Lactational Insanity.—When a woman, in addition to having a [illegible], feeds the natural duty of nursing it, and she is perhaps not [illegible] in general health, and is in poor circumstances improving hard [illegible] and insufficient nourishment, she may, if there is any [illegible] to neuroses or to insanity, become affected in mind during nursing. We call this "lactational insanity." It is not [illegible] a disease attended by exhaustion of body and depression [illegible]. The mental symptoms are usually preceded by headaches, [illegible] of light, feelings of exhaustion, and irritability. If these are [illegible] and treated in time, the chances are that no mental symptoms appear. When they do appear, the risk of suicide should be [illegible]. In some cases the symptoms are those of mania. My [illegible] that over 77 per cent of the lactational cases recover, [illegible] recovery takes a longer time than in the puerperal cases, [illegible] general strength has run down to a greater degree. Lactational insanity seldom occurs among the better-off classes, the reason [illegible] that they have proper nourishment and are not [illegible] worried while they are nursing their children. With proper [illegible] and good we should not lose a lactational case. Most [illegible] respond to such treatment at once.

The Mental Disturbances of Pregnancy.—There is a rare form of [illegible] disease. The symptoms are usually a mild depression, but there [illegible] always a risk of this depression leading to suicide. Most cases of [illegible] mental disease of pregnancy have a bad neurotic heredity. The [illegible] cases, those sent to mental hospitals, only recover in the [illegible] 60 per cent, and of those who do not recover a [illegible] proportion rapidly into dementia. Women are more liable to have [illegible] symptoms during the first than subsequent pregnancies, [illegible] the [illegible] over thirty-five. As a consideration of prognosis, the [illegible] of [illegible] actual symptoms occurring during early pregnancy, [illegible] or premature labour, is now a necessary to be seriously

[illegible] by the [illegible]. [illegible] I [illegible] that [illegible] after consultation with another medical man and with the written consent of the husband or nearest relation. It gives a better chance to the mother, which is the first consideration, and it prevents the entrance into the world of a human being who would be extremely liable to be mentally affected. Dr. [illegible] describes the [illegible] of pregnancy [illegible] those in predisposed subjects [illegible] of the [illegible].

The mental disturbances connected with childbirth [illegible] proportion of 5 per cent puerperal, 1 per cent lactational, and 1 per cent pregnancy, in Edinburgh. In Cumberland and Westmorland the experience for the ten years 1860–70 was that [illegible] proportion of 17 per cent of all the female cases. When they recover they remain well mentally, with very small chance of relapse, except in those who have subsequent childbirth.

THE EPOCHAL MENTAL DISTURBANCES.

In addition to the mental disorders of which I have spoken connected with childbirth, all the other epochs of life are subject to mental disturbances of a somewhat characteristic kind, with many distinctive symptoms and marked differences in their processes. In the ordinary man and woman, with a reasonably good heredity, the various crises and epochs of life are passed through without much risk of mental upset. It is different with those of the neurotic and psychopathic constitution. The physiological characteristics are, in them, more liable to pass into pathological states. Each era of life has its own normal psychology, and the passage from one into the other may quite naturally be expected to have some influence on the mental working. The epochal psychoses will always be [illegible] related with the [illegible] physiological [illegible], and we know that the [illegible] periods of life are often attended with [illegible] symptoms as well as mental symptoms.

Childhood, Boyhood, and Girlhood. This era has no very clearly characteristic psychology, and is very free from such mental disturbances as can be [illegible]. When such disturbances are seen they usually take the form of short attacks of [illegible] delirium, which soon [illegible], but [illegible] a few [illegible] before [illegible]. A very few indeed have attacks of depression [illegible] which [illegible] to be recurrent. There are some children, [illegible] of the neurotic diathesis, who, whenever they become feverish from any cause, or [illegible] temperatures under 100, [illegible] delirious. [illegible] [illegible] [illegible]

Puberty and Adolescent Mental Disturbances. The great physical and mental changes that take place at puberty and later, through the period of adolescence, are attended with more [illegible] and more risk than any of the epochs of life except [illegible]. It is unfortunately true that the prognosis is very serious [illegible] at these ages. At least 20 per cent of the mental cases ultimately [illegible] that state of mental deterioration and death which I [illegible] mental degeneration and dementia praecox.

[illegible] the most characteristic phases of the mental disturbances [illegible] during adolescence [illegible] often very acute in character, each [illegible] and when at a [illegible] seeming [illegible]. But these attacks have a tendency to return, [illegible] times. In fact, adolescent insanity, as I have called it, [illegible] periodic and recurrent form. In forming a prognosis [illegible] mental disturbance it is, in the first place, necessary to [illegible] whether the patient is severely developed and has no bodily [illegible] degeneration. These unquestionably are bad signs [illegible] recovery. If, in addition, he has been somewhat backward [illegible] development or prone to undue excitability, or has shown [illegible] habits and character in a marked degree, if he has been [illegible] and not very educable, then the outlook is not very [illegible] but not necessarily very bad. Even cases with such characters [illegible] many instances. If, on the contrary, he has been well [illegible] and normal up to the time of the attack in body and mind, [illegible] attack has been of a more depressive character, and if, after the [illegible] that the subsequent attacks are less acute and shorter [illegible] we are entitled to form a favourable prognosis. As a [illegible] fact, mental disease of marked character does not occur so [illegible] until a later period of adolescence, namely, from seventeen [illegible] years. I have always held and thought that the liability [illegible] attacks was coincident in persons with a bad heredity with, [illegible] arrest in growth of the brain, which has virtually ceased [illegible] that time, but with its development in its highest function of [illegible]. One need not be a physiologist or a psychologist to [illegible] how microcephalic, damaged in texture of fibre, are the subtle changes [illegible] which mean full reasoning power, large powers of [illegible] and moral feeling, development in a normal form of the [illegible] instincts, proper regulation of sex feelings, appreciation of [illegible] forms of literature, and cleanliness and wholesomeness of the [illegible]. All these have not actually come to perfection at the age [illegible] they have, we should have, by twenty-five. A moment's [illegible] shows that in the frontal lobe of the brain, which for these [illegible] functions, is more and later a comparatively [illegible] put on [illegible] and its higher cells. Now the period of this strain is the [illegible] liability to adolescent insanity. If we closely analyze the [illegible] developments at this time of life, we see marked changes in the [illegible] of attaining the mental and bodily ideals of man and woman.

The man's form takes on a manly type, the beard grows, and the voice completes the change that has begun at puberty. In the woman, the form rounds up towards the ideal type of beauty, the breasts develop, and the whole woman is perfected. Now if we find these changes taking place unusually during the time that a patient is subject to their recurrent attacks of mental excitement, then we form a favourable prognosis. Nature has an such adolescent "come through" the trial and bad on her, and there is a reasonable probability that the bad case to mental disturbance has passed, at all events, and bad! because of the characters occurs.

In a certain proportion of the cases of adolescent mental disturbance (about 22 per cent) there takes the course of depression, which is accompanied by death, and recur, though not quite in the same degree as in the manic-excited cases. The prognosis in the melancholic cases is better than in those of mania. Taking the whole of the mental disturbances of adolescence into account, they recover at the rate of 60 per cent; but if we limit ourselves to the depressed cases, the rate of recovery is about 10 per cent more.

Instead of exaltation or depression, we may meet with stupefaction, confusional, and lethargic symptoms, sometimes less with catalepsy and "trance." The prognosis is not so good in such patients, but is by no means very bad.

The worst class of symptoms as regard to prognosis are those which Kraepelin calls "constituting hebephrenic psychosis of which I shall speak presently. I had always felt that the men who could tell us in the early stages of any case of adolescent insanity the symptoms which indicated incurability, would add greatly to our exact knowledge of psychiatry, and I welcomed Kraepelin's induction accordingly.

There is an undoubted liability to a recurrence of mental disturbance in those who have had an attack at adolescence and have recovered. Traced them through their whole lives, I find that nearly 20 per cent are liable to recurrence in some form or other.

The general aspect of adolescent insanity is that, in about one-third of the cases, instead of recovering, they pass slowly into dementia. Nature has not been able to bear the strain of the period of complete development, and the young man or woman virtually dies as regards all the higher qualities of mind. I believe that in most of these, dementia is preceded by a "the beginning." No methods of prophylaxis or treatment would have had much chance in saving their mental life. It is true that modern medicine looks on them as having some analogy to the cases of congenital imbecility in which a mental death has taken place in the earliest periods of life. The brain of the imbecile has been "caught" from the beginning; the brain of the adolescent was fit up to puberty, and then became "caught" from some deep-seated hereditary cause.

In addition to imbecility and adolescent insanity, we notice during brain development a series of lesser mental and moral changes, such as of perverse sentiment and precocities, which are due to the same

[illegible]ditary defects, and are, in many ways, of the same essential nature as technical mental disease. These frequently occur at earlier ages than adolescent insanity, sometimes even before puberty. They consist, in some cases, of stupidity and lethargy, in others of [illegible]ions of the social instincts, in others of causeless aversions to father, mother, or other near relations. Some show their peculiarities [illegible] abnormal intolerance of control, incompatibility of temper, and, [illegible] immoralities and criminal acts. It is a striking fact that [illegible]lf of all convictions for crime are found in offenders under the age [illegible]nty-five. There are many cases of the morbid impulsiveness, the losses of control, and the tendencies to drink which I have described, [illegible]r at that age. Most of such cases are ascribed simply to bad [illegible]t, which the parent and the schoolmaster usually treat by punishments. A few of such cases recover from these mental and [illegible] peculiarities towards the end of adolescence, but unfortunately [illegible] look is bad in most of them, and they remain, so long as they live, the bad citizens, the skeletons in families, and the criminals of [illegible]

Dementia Præcox.—Since I first segregated those forms of insanity [illegible]scribed and called them 'adolescent insanity,' Kraepelin, of [illegible] has segregated a group of mental cases occurring about the [illegible] which he has called 'dementia præcox,' and holds they [illegible] distinct variety of mental disease, with distinctive symptoms [illegible]ory. That term covers the unfavourable region of adolescent [illegible] Those who recover, Kraepelin would include in his 'manic-[illegible]ive insanity.' The chief features of dementia præcox [illegible] that it begins slowly over a period of years, and the patient shows his disorder more by what he does than by what he says and thinks. He shows odd or bizarre conduct. The emotional tone is blunted and [illegible]d. There is a peculiar loss of consistency between ideation, [illegible] and will. The will-power is perverted or lost, the conduct [illegible]matic, there are what is called negativism, 'stereotypism,' [illegible] mannerisms, and indifference to personal appearance. The [illegible] often has hallucinations, and is completely changed in character. [illegible]lin divides the cases into three forms: (1) 'Katatonic,' [illegible] Hebephrenic,' and (3) 'Paranoid.' All three varieties are un[illegible]ble as to prognosis, but the first and second are better in this respect than the third. Many of the katatonic are those which I have described under 'stupor,' and we have seen that the chances [illegible]ery are on the whole favourable in this form. But all forms [illegible] to be deteriorating psychoses. If rightly diagnosed, all cases of [illegible]ntia præcox should be incurable.

The Mental Disturbances of Decadence—The Climacteric and Senility.—When we come to that period of which men and women [illegible] corner of life, when they pass into the first stage of d[illegible] [illegible]olution, and particularly when they arrive at the latter [illegible] [illegible] some of them are liable to certain forms of mental disturb[illegible] the symptoms of which are markedly different from those of the

[illegible] period of life. The [illegible] of life. The [illegible] of life [illegible] the [illegible] power of [illegible] that it [illegible] [illegible] it [illegible] [illegible] [illegible] [illegible] [illegible] There are [illegible] [illegible] [illegible] [illegible] [illegible] and [illegible] [illegible] the power to [illegible] [illegible] different [illegible] from [illegible] of [illegible] [illegible] of the [illegible] of the other sex [illegible] [illegible] and [illegible] take the place of love [illegible] The climacteric period begins [illegible] women [illegible] in the [illegible] period of life, and [illegible] [illegible] of the [illegible] [illegible] climacteric [illegible] of sixty [illegible] In some of the lowest [illegible] reproduction is at once followed by death [illegible] the loss of the power of reproduction [illegible] followed by a lessened mental and bodily [illegible] The symptoms of climacteric unsoundness of mind [illegible] [illegible] character. The [illegible] [illegible] appetite [illegible] [illegible] intense [illegible] the patient has fears [illegible] sometimes of [illegible] intense character. She [illegible] terrified that she will lose control over herself or even commit suicide. She [illegible] [illegible] for all these feelings and [illegible] distress. Work is difficult. In some cases there are hallucinations of hearing. [illegible] [illegible] courage, and mental [illegible] [illegible] often a feature of hypochondriasis [illegible] symptoms, and a feeling that life is no longer worth having.

The prognosis in these conditions is not so unfavourable as is commonly supposed. It must be kept in mind that the [illegible] is not a [illegible] [illegible] It begins slowly, and it takes [illegible] at least two [illegible] to get completed. In women 57 per cent recover, but [illegible] per cent. I do not give up hope of recovery in climacteric [illegible] at least two years. The signs of recovery are a return [illegible] enjoyment of life, but with less intensity [illegible] Weight should be gained, fat should be put on, the sleep should become normal. The post-climacteric happiness and power of work are not as great [illegible] [illegible] but there are many women [illegible] nervous [illegible] [illegible] who experience a quiet comfort and happiness which they never [illegible] [illegible] The storms of life are, as it were, past; the patients have sailed into smooth water. During the climacteric, whether normal or abnormal in its character, I have a profound [illegible] in change of environment, and especially in living in the fresh air. Suicidal [illegible] must be carefully looked for in both sexes.

Old Age. [illegible]

[illegible]

[illegible] ... there are some cases, however, even of the advanced age, whose symptoms are so troublesome and so distressing to all who have to do with them, that institution treatment is necessary. But all good institutions now have hospital wards where the arrangements are specially adapted for treating such cases.

Rarer Etiological and Clinical Forms of Mental Disease

In addition to these etiological and clinical forms of mental disease of a somewhat definite type, there are many others of a less common kind.

Mental Symptoms from Influenza. Since the year 1890, when the first great wave of influenza swept over the country, there have been innumerable cases where the primary disease was complicated by nervous and mental symptoms. In fact it may be said that every attack of influenza in some way or in some degree lowers the nervous tone, either during the attack or afterwards. These results often assume the form of depression of spirits, and a lessening of the nervous energy, which lasts for weeks and sometimes for months after the actual disease has passed away. Many of us who have had severe attacks of influenza feel that we have been the worse for it permanently. I have been in the habit of saying that influenza has left the nervous and mental tone of Europe and America lower by many degrees than it found it. Some of the cases of melancholia were very marked in both their bodily and mental symptoms. They had [illegible] energy, feeling that life was scarcely worth having, anorexia,

[illegible]

Diabetic Mental Symptoms. A very large number of the cases of diabetes have some mental or nervous symptoms in addition to the liability to diabetic coma. It usually takes the form of depression, irritability and incapacity to do the usual amount of work, mental and bodily. I have seen acute cases of melancholia occasioned by diabetes, of them dying of the attack. The treatment of these nervous and mental affections is that of diabetes, and the prognosis is certainly unfavourable.

Bright's Disease with Mental Symptoms. A few cases of Bright's disease show marked mental symptoms, usually of the toxic character, begin with irritability and restlessness, passing into mental symptoms with periods of delirium. This condition I look upon as the equivalent of the convulsions that are common in the disease, and only determined by the fact that the patients had a bad neurotic history which rendered them more than normally liable to be affected by the toxin in their higher cortical regions.

Phthisical Insanity. The early, and what used to be called the incipient stage of phthisis is, in a certain number of cases, accompanied by somewhat distinctive mental symptoms; suspicion, slight mental enfeeblement, irascibleness, mild attacks of excitement, tendency to follow regular employment, with digestive and nutritional weakness which I called 'phthisical insanity.' My study of this question led me to believe that about 3 per cent of the cases sent to asylum hospitals were of this character. I used to think that it was a tractable form of mental affection, but the modern treatment of phthisis, when applied to these cases, results in a larger number of cures than I used to see. I now believe that the cause of such mental disturbances is due to the toxic influence of the tubercle bacillus on the brain in persons specially predisposed to mental disease. The

recovery rate of this psychosis under the present treatment of phthisis may be put down as about 50 per cent.

Mental Symptoms in Acute Rheumatism and Chorea. In a few cases of the typical acute rheumatism which we used to see before the salicylic treatment was introduced the patients would suddenly become very acutely maniacal, this being accompanied with an extremely active form of chorea. The rheumatic temperature would keep up during this state while the joint affections would cease. Most of the cases recovered, but in a few death took place during such attacks. I have no doubt whatever that these resulted from a [illegible] of the rheumatic toxin or micro-organism from the joints to the spinal cord and brain cortex. It was [illegible] the lines of [illegible]. The treatment is that of the acute rheumatism, [illegible] salicylates, etc. [illegible] have been put on record to give reliable statistics of [illegible]. My impression is that such cases are far less frequently seen now since the modern treatment of acute rheumatism [illegible] than formerly.

The [illegible] chorea of early adolescence is complicated [illegible] by a delirium accompanying the [illegible]. The patients first show [illegible] and then [illegible] delirium, sometimes accompanied by [illegible] of violence and [illegible]. Most of such cases recover but [illegible]. The treatment is that of chorea, plus [illegible] nerve sedatives. [illegible] by diminishing the [illegible] extreme [illegible] for the time being at least. Most of the cases recover soon and have no relapse.

Masturbational Mental Symptoms. [illegible] is a frequent accompaniment of many forms of mental disease, and in that case it always aggravates the mental symptoms, tending to produce mental instability and confusion. On the whole it worsens the prognosis if persistent. There is no such thing as a distinct form of insanity associated with and caused by masturbation. [illegible] however, [illegible]. It is far more frequently a symptom than a cause, and when present it is not nearly so [illegible]. My experience is that [illegible] per cent of [illegible] cases [illegible]. Some of these [illegible] mental weakness which [illegible].

Myxœdema and Exophthalmic Goitre. The mental symptoms which are liable to accompany these two conditions are well known. In both cases they often become [illegible] severe [illegible] be sent for treatment [illegible] at least that was [illegible]. The symptoms [illegible] but they all have [illegible]. They all have [illegible].

The Delirium of Young Children.

The Mental Symptoms of Lead and Arsenical Poisoning.

The Genesis of Psychoses in Persons with a Mental and Nervous Heredity and the Mental Symptoms

[illegible]

MERCURIALISM. [illegible]

[illegible] encephalopathy. The symptoms [illegible] interval has elapsed since the first exposure. With regard to oral administration, it is stated that the taking of [illegible] has been followed by death. One case has been recorded in which extensive [illegible] apparently followed the ingestion of [illegible], and in spite of this the patient recovered.

[illegible] the following [illegible] may rapidly follow [illegible] days, [illegible] speech, [illegible] with frequent [illegible] diarrhoea with bloody evacuations [illegible]. The prognosis [illegible].

[illegible] patient [illegible] cerebral symptoms, [illegible] with palpitation [illegible].

[illegible]. In both [illegible].

[illegible]

MIGRAINE. Migraine, with its characteristic paroxysmal [illegible], usually unilateral, frequently preceded by the well-known [illegible] disturbance, and usually culminating in vomiting, [illegible]. Migraine is [illegible] in childhood and subsequently [illegible], often with [illegible] periodicity, at intervals of about three or four weeks, [illegible] tending to disappear in old age. In [illegible] spontaneously [illegible] towards the end of [illegible] period. In addition to the natural tendency to [illegible] there [illegible]. Sometimes [illegible]. Gowers thinks that [illegible] in which [illegible] and [illegible], but it is difficult to [illegible] this.

[illegible]

MITRAL DISEASE. See Heart, Chronic Valvular Diseases of.

MOLES (Simple

MOLES, VESICULAR.

1. **Excessive Hæmorrhage.**

2. **Perforation or Rupture of the Uterus.**

The Coincident Development of Chorion-epithelioma

Complications.

Mortality. From all causes

MORPHIA HABIT.—(*See* DRUG H

MOUTH, CANCER OF.—(S

MOVABLE KIDNEY. (*See* KIDNEY, MOVABLE.)

MUMPS

Complications.

MUSCULAR ATROPHIES.

Arthritic Muscular Atrophy.

Ischæmic Muscular Atrophy (v. Volkmann's paralysis)

Neuritic Muscular Atrophy

Myopathic Muscular Atrophy

Progressive Muscular Atrophy (peroneal or Charcot-Marie-Tooth type)

Progressive Muscular Atrophy (chronic anterior poliomyelitis)

MYASTHENIA GRAVIS.

MYCOSIS FUNGOIDES. [illegible]

MYELOID SARCOMA. [illegible]

MYOCARDIUM, PRIMARY DISEASE OF. [illegible]

Acute Infections of the Cardiac Muscle

Progressive Degenerations of the Myocardium.

Impairment of Contractility of Ventricles.

Impairment of [illegible]

Disturbances of the Other Functions of the Cardiac Muscle.

[illegible]

[illegible]

The Likelihood of Sudden Death in [illegible] depends on two things. It may occur as a result of

[illegible]

The Influence of Treatment on [illegible]

[illegible]

Caven F. [illegible]

MYOPATHIES.—(*See* MUSCULAR ATROPHIES.)

MYOSITIS OSSIFICANS. [illegible] after a fracture, a mass of bone forms in the neighbour-[illegible] to dissemination of osteoblast.

Generalized Myositis Ossificans is rare, lasts about ten or twelve [illegible]

Traumatic Myositis Ossificans has [illegible] introduction of massage and movements in the treatment of [illegible] and the use of [illegible] for diagnosis. The commencement of the mass of bone is in the substance of the brachialis anticus [illegible] the lower end of the humerus or at the insertion of the [illegible] The writer has seen it in the extremities in association with [illegible] of the condyle of the femur, and in the [illegible] after fracture [illegible] The hard mass in the muscle can be felt upon the [illegible] It usually appears some weeks or months after the [illegible] and may cause [illegible]

[illegible] depends to a considerable degree on the treatment. [illegible] removal by operation usually leads to recovery, and perhaps

NASAL ACCESSORY SINUSITIS.

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	116	[illegible]	[illegible]

Maxillary Sinus.

Frontal Sinus.

Ethmoidal and Sphenoidal Sinuses.

NEPHRITIS

Acute Nephritis

surprising and disappointing. Fatalities may occur, say, from a uremic convulsion in a patient who, carefully examined, does not appear to be in a critical condition. As with treatment, so with prognosis, every case must be carefully studied, considered on its own merits, and due weight given to the more important factors. Amongst other factors, consideration must be given to *response to treatment*. Favourable signs in the early stages are an increase in the quantity of urine and a diminution in the œdema; in the later periods, diminution in the albumin, blood, and formed elements in the urine, and a definite diuresis. When improvement is taken place, not only is there an increase in the quantity of urine, and a diminution in the amount of albumin, but a change takes place in the character of the deposit; epithelial cells and free blood corpuscles become less numerous, and epithelial and blood casts are gradually replaced by the hyaline and granular varieties. It has been suggested that some prognostic value can be attached to the size, and especially to the breadth, of the tube casts found in the deposit; large *broad* epithelial casts showing a profound desquamation of the tubules, but it seems very doubtful if reliance can be placed on this factor. At times, in the course of an acute nephritis, improvement seems to take place; albuminuria diminishes, the urinary quantity returns to about the normal, but the patient remains somewhat anæmic, a little œdema may be found about the eyes and ankles, the centrifuge shows the presence of granular and fatty casts, and, after a time, the radial artery becomes faintly palpable. Such a patient is passing into a condition of subacute diffused nephritis, and ultimate recovery seems doubtful. Particularly disappointing are cases where improvement is at first apparently rapid, the urinary amount returns to the normal, with only a trace of albumin, and casts are difficult to find, even with the centrifuge. Yet, when soon the diet is altered from the minimum of protein and the maximum of carbohydrate and fat, a fresh exacerbation takes place, accompanied by hematuria. In such cases, the kidneys have been so damaged that they cannot undertake a reasonable amount of work, and the chance of ultimate recovery is not good. Yet, in acute nephritis, even when apparently of a hopeless character, there is always a chance of recovery, which encourages the physician to persevere in therapeutic measures. The writer will remember the case of a young man who had been ill for two months. The urine was greatly reduced in quantity, and contained copious albumin, blood, and tube casts of all varieties. There was universal anasarca, so marked as to require tapping. Syphon tubes were introduced into the legs, and a trocar into the abdomen. For four days the patient lived on a nitrogen and chloride poor diet, and passed most of his time seated on the edge of his bed with the feet dependent, draining continuously, the tubes being changed from time to time. With the disappearance of the œdema there was relief of the circulation, the vessels resumed their functional activity, and within a few months the patient passed an Army Board for a commission in India.

One may sum up experience, then, by saying that in acute nephritis prognosis must always be guarded; recovery may take place even in apparently hopeless cases; but a considerable proportion of the sufferers pass into a subacute or chronic condition, with interstitial and cardiovascular changes, from which complete recovery never takes place. (*See also* SCARLET FEVER.)

Chronic Diffused Nephritis is very justly looked upon as a grave condition, the prognosis in which is bad. Cases are recorded where recovery has taken place; but there always remains the doubt if the line had been sufficiently drawn between a somewhat persistent form of acute nephritis and a true chronic diffused nephritis. The fatal issue may occur in from six months to two years, and may result from [illegible] exhaustion with pronounced anæmia. The patients frequently exhibit profound alimentary disturbance, and can neither take nor assimilate sufficient nourishment. Frequently there is failure of the myocardial tonicity, with dilatation and pronounced anasarca. [illegible] in its protean manifestations, or pneumonia, may prove the [illegible] feature of an intercurrent process, resulting in an inflammation of a serous membrane.

Prognosis will always be grave, but certain features will help in [illegible] the gravity. When there is marked diminution in the quantity of urine, and anasarca is universal and extreme, and the phenol-sulphone-phthalein and other tests show a marked loss of functional activity, the patient will seldom survive more than a few months. When the urinary quantity is not much reduced below the normal, and the urine, though containing a large amount of albumin, shows only a [illegible] number of tube casts and leucocytes, and the functional activity is not pronouncedly reduced, the condition may run a much more chronic course, and pass ultimately into the "small white kidney." The patient may have periods of fair health; but a small upset, such as a mild tonsilitis, may precipitate grave symptoms, with a recurrence of œdema; and during one of these exacerbations the patient dies. Help in prognosis may be obtained by considering the functional activity of the kidneys, the condition of the circulatory system, and the results of treatment. When there is marked delay in the excretion of iodide of potash, or of phenol-sulphone-phthalein, the prognosis is grave. Yet at times the excretion of the phthalein may be as low as 16 per cent in two hours, months before the fatal issue. Cardiac dilatation and arterial degeneration are of grave import. Œdema may be due to salt retention; but salt retention may be combined with degenerative changes in the smaller vessels, and with cardiac failure. When œdema is due to salt retention, there will be diminished [illegible] excretion in the urine, and a salt-free diet will usually give [illegible] amelioration of symptoms. When salt-free diet is instituted in pleuritic, ascitic with diminished œdema, prognosis is [illegible] than when vascular degeneration and cardiac failure are [illegible] factors which are unintluenced by a salt-free diet. In these [illegible] the mere mechanical presence of the fluid in the cavities and

tissues has a deleterious influence on the functional activity of the organs and increases malnutrition. Neither the alimentary canal nor the heart can carry on its work efficiently; anæmia and malnutrition increase; and defective coronary circulation adds to the difficulties of the attempts of a starvation heart. Again, it may be found that, at times, a period of a protein-free diet will give considerable relief of symptoms. Speaking generally, then, it may be concluded that response to treatment makes the immediate prognosis less serious; while want of proper response renders it very grave.

Chronic Interstitial Nephritis. Pathologists are gradually coming to the view that the underlying and primary factor in chronic interstitial nephritis is a disease of the smaller blood-vessels, a widespread disease of the arterioles of the internal organs, in which the vessels of the kidney participate. The disease, in its fully developed form, involves the kidney, producing the primary contracted or small red granular kidney. This being so, it may at once be granted that the condition is incurable. True it is that Senator has stated that recovery is possible if the disease is taken early; but this, if correct, is exceptional, and is outside the field of practical politics. Yet cases as seen in private practice must not be assessed at the same degree of severity as the fully developed picture obtaining in the hospital ward. The established diagnosis of chronic interstitial nephritis does not by any means condemn the subject to a life of invalidism. In the writer's experience, the existence of chronic interstitial nephritis has been compatible with an active business career for fifteen years after the diagnosis was definitely established. Other observers have recorded cases where the condition has lasted twenty, and even thirty, years. Prognosis depends, not so much on anatomical changes, as upon the functional activity of the kidney and of the heart. This being granted, it is obvious that the patient has a right to a full knowledge of his condition, and the factors which should regulate his life; for much of the outlook will depend upon his ability to lead a simple life. It is fortunate when the disease is discovered early, and when the physician can obtain the hearty cooperation of the patient in regulating diet, and working hours, with a view to maintaining reasonable health and permanent life. As Janeway points out, cases of chronic interstitial nephritis fall into two groups. In one group the clinical picture is that of some degree of cardiac inefficiency, and death is a cardiac death. In the second the predominant symptoms are cerebral—headache, vertigo, and apoplectic attacks—and there is evidence of severe renal insufficiency. In forming an estimate of the severity of the prognosis consideration must be given to the condition of the circulation, to the kidney function, and to the occurrence of complications of a serious type. Every case will require individual study, and undue importance must not be given to a single factor.

Cardiac hypertrophy of the concentric type, with high blood pressure, will be present. Yet if the functional activity of the organ be good, immediate prognosis may be favourable. Unfavourable

phenomena are those suggestive of loss of compensation: palpitation, dyspnœa on mild exertion, and marked increase in the area of cardiac dullness, with some œdema about the ankles. These factors show a loss of tonicity. No doubt they may disappear under therapeutic measures, but they show that the heart has been working beyond its power, and that a breakdown is imminent. In this respect, consideration of the *blood-pressure* is important. It may be accepted that, within reasonable limits, high blood-pressure is necessary in these cases to maintain the functional activity of the kidney, but excessive blood-pressure forces extra work on the heart, and it may break under the strain. A blood-pressure of 180 to 200 mm. Hg. must tax the powers of the heart considerably, and must lead to end either in cardiac insufficiency or local cerebral hemorrhage. A systematic estimation of the blood-pressure will greatly help the practitioner in forming a prognosis. Given that it is moderately high, but that from month to month, with no signs of failing tonicity, and with fair general health, prognosis may be regarded as comparatively favorable. If, nevertheless, notwithstanding treatment, the pressure persistently rises, prognosis becomes grave: either the heart will give way, or a cerebral hæmorrhage will close the scene. (See Arteriosclerosis, Heart.)

A factor which must be taken into consideration in prognosis is the patient's attitude and willingness to carry out treatment. The patient who can spend the winter months in an equable and mild climate, pay occasional visit to a spa, and carefully carry out directions as regards the avoidance of chills, over-work, and dietetic errors, has obviously a far better chance of prolonged life than the working man exposed to all weathers, or the harassed professional or business man living a life of stress.

The manner of death in chronic interstitial nephritis must always be problematic; most commonly, however, it is a cardiac death, a death from compensation, at times combined with distressing uræmic symptoms. Cases of sudden death from cerebral hæmorrhage are not infrequent.

Ophthalmoscopic Results.—The practitioner will find the systematic use of the ophthalmoscope a most valuable aid to prognosis in chronic nephritis. The retinal changes which may be present have been classified as follows: (1) diffused opacity from œdema, white patches, hæmorrhages, optic papillitis, diffused retinitis, and optic neuritis secondary to inflammation. Of these changes, the first three are relatively common, the second three are less frequent. The most characteristic and striking are the white or yellow dotting spots about the macula and optic disc, and, in advanced cases, scattered through the retina. At first small and few, they may coalesce and form larger spots which, situated in the vicinity of the disc, may be as large as the disc itself. At the outset they occur as numerous small pinhead points; later they may assume an interrupted line, or fan-like streaks, in all directions.

These changes are degenerative in character, and may be accompanied by hemorrhagic extravasations, or extravasations into the retina alone, and may vary, according to age, from the bright red of the recent to the dark red and finally atrophic patch marking the site of absorption of a former extravasation. The vessels of the retina will often show sclerosis, and as Gunn pointed out, they have an exaggerated bright reflex. The central light streak is very distinct and sharp while the whole surface of the vessel is of a somewhat lighter shade than normal. These changes in the retina are degenerative in character, and are collectively described as albuminuric retinitis. They occur most frequently in chronic interstitial nephritis, and are of very grave import. A patient with chronic albuminuric nephritis should not survive more than two years. Cases are recorded where the patient has lived for longer, but these are the exception and not the rule. The gravity of albuminuric retinitis as its beginning as progressive cannot be overestimated. Of course, a sudden attack does not, of course, apply to the retinal changes which may occur in the kidney of pregnancy. There complete recovery of kidney health may occur but the patient may be left with permanently damaged vision.

Functional Renal Tests.—To the physician anatomical changes are only important in so far as they interfere with the functional activity of an organ. By investigation of the activity of the kidney valuable data will be obtained for the estimation of prognosis in nephritis. Of the different functional tests the most valuable is the phenol sulphone phthalein test described by Rowntree and Geraghty; the simplest for the practitioner is the iodide of potash test.

The phenol sulphone phthalein test depends upon the capacity of the kidney for the excretion of the pigment. The apparatus required consists of a one-litre flask and a colorimeter. Before making the observation, the patient is given a drink of water. The injection, which can be obtained in an ampoule, 1 c.c. of 6 per cent. solution, 6 mgrms. of the phthalein, is injected into the muscles of the lumbar region. The patient empties the bladder at the end of one hour after the injection, and again at the end of the second hour. The urine voided at the end of one hour is poured into a litre flask, and rendered strongly alkaline with caustic soda solution to give the maximum red colour; water is now added to the litre mark, and the mixture shaken and, if necessary, filtered to remove phosphates. The standard colour for comparison is obtained by the dilution of 1 c.c. of phthalein solution in 1 litre of water. This is placed in the standard tube of the instrument. After the urinary mixture is placed in the observation tube, the colours are adjusted, the reading is taken off, and the percentage of excreted pigment obtained. Unless the excretion of phthalein is very much retarded, the ordinary urinary pigment does not interfere with accurate estimation. In health, 55 to 70 per cent. usually about 50 per cent. of the pigment is excreted during the first hour, 70 to 90 per cent. during the first two hours. Excretion is practically complete after two hours. A diseased kidney shows a very marked decrease in excretion

[illegible] the first two hours. No pigment may appear by the end of the second hour in very grave cases of renal inadequacy. Excretion is noticeably decreased in acute nephritis, but it is especially in acute and chronic cases that the test is of value in estimating [illegible]. Phthalein is excreted in urine, if not entirely, by the tubules. Decrease of excretion points to a deficient functional activity of the [illegible].

No accurate figures can be given as a guide to prognosis from the phthalein test; but, speaking generally, an excretion of 50 per cent or more shows serious renal inadequacy. In many cases of parenchymatous nephritis, excretion falls to 30 per cent or lower. The lower the percentage, the graver the prognosis. In chronic interstitial nephritis, when the kidneys' function is being fairly well maintained, it will be from 50 to 60 per cent. When uræmic phenomena are present, the percentage will fall very low, in some cases even to [illegible]. In these cases there is pronounced inadequacy, with nitrogen retention. In chronic nephritis, a pronouncedly low excretion points to unfavourable prognosis, even though no apparent uræmic phenomena are present.

The iodide of potash test is simple, but not of the same value as the phthalein test. If 7½ grs. of iodide of potash be given to a healthy man, it will be recognizable in the urine in a very few minutes; the total quantity will be excreted within about sixty hours, when urine will no longer give the tests for iodine. Iodide of potash is excreted by the tubules, and when there is disease of the tubules the excretion of iodide is greatly delayed, the time being doubled or even [illegible] in some cases.

[illegible] *Non-protein Nitrogen of the Blood.* The non-protein nitrogen of the blood is made up for the most part of urea, uric acid, and ammonia-nitrogenous bodies, and credit is due to the French school for strongly insisting on the importance of their estimation in considering the question of prognosis in nephritis. To Folin we owe a method of estimating non-protein nitrogen which is simple and accurate. The normal non-protein nitrogen of the blood stands in health at from 22 to 26 mgs. per cent. It can be influenced by diet, increasing after a full meal containing considerable proteins, and diminishing on fasting. If kidney function is interfered with, there may be diminished excretion of nitrogenous waste products, and the blood-nitrogen will rise. This phenomenon is not, however, present in every case of nephritis, and a normal or only slightly raised blood-nitrogen is a favourable factor in prognosis. When blood-nitrogen rises to [illegible] or over in nephritis, the patient is suffering from serious urinary retention, there is grave renal inadequacy, and the prognosis is [illegible]. At times the blood-nitrogen may rise to a high figure [illegible]; generally, it may be stated that when the non-protein nitrogen of the blood rises above 100 mgms. the duration of the illness is to be reckoned in days, seldom in weeks. (*See also* UREMIA.)

Francis D. Boyd.

NERVE INJURIES. These differ from those of other structures by reason of their function. Not only does the nerve itself suffer but the parts supplied by it are affected, and it is with regard to these as well as, and more often than, to the nerve itself that the treatment is directed and the prognosis depends.

Injury may affect a nerve in its course, its continuity, or at its termination, one of its branches of distribution being involved.

Injury in Continuity.

Two groups are recognized:

1. Those in which the naked-eye continuity of the nerve is preserved, *partially* or *completely*, which I am accustomed to term anatomical division.

2. Those in which the injury produces partial or complete interruption of conduction without naked-eye solution of continuity. To this I give the name physiological division. This classification, which was introduced by the writer in 1903, is now generally accepted.

Prognosis in General. Prognosis depends not only upon prompt treatment at the time of the accident but to a large extent on the most supervision for many months. The treatment of injury to a nerve in its continuity consists in keeping up the nutrition of the parts supplied by it and preventing the occurrence of contractures in muscles opposed to those affected until conduction is restored by natural means alone or aided by operation. In comparatively few cases, apart from accidental wounds in which it is essential, operation necessary; it should always be avoided if possible, and sufficient time given to be certain that recovery will not ensue unaided.

The large number of peripheral nerve injuries that have come under observation during the course of the War have revealed no new facts with regard to prognosis. They have, however, amply confirmed our previous experience.

Relaxation of paralyzed muscles must be maintained until voluntary power is restored; unless this is done, recovery is inevitably delayed. This muscular relaxation is the most important point in treatment, but it is the one most often neglected. It is quite useless to undertake the treatment of a case of nerve injury unless this can be carried out. While formerly it was a common experience to find patients with nerve injuries, particularly those of the musculospiral, under treatment with no attempt being made to relax the paralyzed muscles, it is fortunately now a rarity. During the last two years I have admired the ingenuity displayed, often unnecessarily, in the construction of splints to prevent it. The simplest apparatus suffices, and, as long as the muscles are kept relaxed, is all that is needed.

In cases needing operation it is too often assumed that, as soon as the ends of the nerve have been united, the surgeon's work has ceased; it has only just begun. The careful supervision of the patient and

the direction of the treatment, it may be for two or three years, is most important.

Complete Anatomical Division.

In complete anatomical division, immediate primary suture is the correct procedure, the nerve being united by absorbable suture and [illegible] to prevent the formation of adhesions.

Prognosis after Primary Suture.—Primary union, by which was [illegible] good union of the divided ends of a nerve without the occurrence of complete degeneration in its peripheral end, is not possible. The subject excited considerable controversy between the years 1860 and 1880. To Létiévant[2] is due the principal credit of explaining by his clinical observations the fallacies upon which the assumption was [illegible].

Before recovery can take place, degeneration must occur in the peripheral end of the nerve, followed by regeneration and reunion with the central nervous system.

Many papers have been written concerning the time of recovery after primary suture, but in the majority of instances they consist of [illegible] of isolated cases recorded by others. The fallacies are so numerous, the question of the exact details of the operation and after treatment is so impossible to define in collections of this type, that the conclusions are of little value.

One of the earliest tables of collected cases occurs in Howell and Huber's[3] masterly paper on the regeneration of nerves. They con[illegible] 66 to 80 per cent of the cases recovered.

Sir Anthony Bowlby[4] appears to have been the first to attempt to settle the question by personal observation of a series of cases. He observed the results of 28 cases of primary suture, in many of which, [illegible] first note was made several years after suture. He considered 16 were successful and 4 failures.

Dr. Henry Head and the writer[5] published a series of cases investigated at short periods from suture to recovery. The question was fully considered by the latter in his Erasmus Wilson Lectures in the following year.

Perfect recovery is possible after primary suture: perfect function [illegible] restored to the affected muscles, and no difference noticed by the patient in the sensation of the part as compared with the [illegible] ing sound one. Although possible—and I have seen it—follow primary suture even of the ulnar nerve—it is unusual. For it to occur, the operation of suture must have been carried out with [illegible] care, the wound must heal by first intention, and the after treatment be eliminated.

The prognosis will depend to a certain extent upon the nerve injured: for example, the musculospiral nerve in the lower third of the arm carries no exclusive supply to any portion of skin, and the muscles it innervates are not so intimately associated with delicate movements of the fingers as are those supplied by the ulnar. Complete

recovery is reached more frequently and more rapidly than in other nerves.

The further the seat of injury from the periphery, the longer the time necessary for full recovery, and the less likely is it to occur.

I have personally observed over seventy cases of primary suture. In all motor power was regained and the second stage of sensory recovery completed. In a few cases however the complete recovery to occur. In a recent paper Spurling states, from investigation of 15 cases of suture, that perfect recovery did not occur in a single case, but 66 per cent of the patients were able to resume work.

If the nerve injured is the median or ulnar, it is improbable that recovery, either motor or sensory, will be sufficient to enable the patient to resume work, or perform any work. Thus while the hand might be perfectly useful to an unskilled labourer, it would be a useless member to an artist or executive musician.

The time after suture at which recovery occurs varies with the distance of the point of suture from the periphery and the method of healing of the wound. Suppuration prolongs it very considerably. In division of one of the nerves of the forearm I saw partial recovery commence about nine months after suture, but perfect sensory recovery could not be expected under three years.

Secondary Suture. Recovery is much slower and prognosis less hopeful than after primary suture, except in the case of the musculo-spiral nerve, in regard to my 53 personal cases of suture of other nerves, or in many in which the operation was carried out by others, which have been seen at various times after suture, did perfect recovery ensue. While this is possible after primary suture, it is improbable after secondary.

Secondary suture of the musculospiral nerve, if the operation is correctly performed and the after-treatment carefully carried out, should be followed by perfect recovery. During the present war this has become a common operation. When sutured in the middle of the arm recovery of the supinator longus and extensors of the wrist commences about the sixth month and all the muscles are acting voluntarily by the twelfth.

The first question to be considered is the relation of the interval between division and suture to recovery. Howell and Huber, and Kennedy,[illegible] among others, considered that the prognosis was better, and the time of recovery shorter, the sooner after injury the nerve was sutured. I stated in my Hunters Wilson Lectures that there was no *direct* relation between the length of time which has elapsed since the injury in cases in which operation was performed before the lapse of two to three years. This is in agreement with Bowlby's[illegible] experience. Although I believe that the time after injury at which suture is performed has no direct relationship to the length of time necessary for recovery, it has an important indirect one, in that most of the factors hindering complete recovery develop as time advances.

Although instances of 'successful' operation have been recorded nine (Jessop[11]) and fourteen (Chaput[12]) years after division, muscular recovery is unlikely after about three years.

There are many factors to take into consideration in estimating the chances of recovery: If the nerve was divided in an open wound, the method of healing—nothing hinders recovery to so great an extent as suppuration; the condition of the muscles as regards wasting and the retention of irritability to the constant current; the presence of contractures in opposing muscles, and the condition of ligamentous structures surrounding joints. The condition of the hand of a patient, for example, who has suffered division of the ulnar nerve below its dorsal branch, in whom a marked claw-hand has developed, is little likely to be improved by suture although the muscles may regain their irritability to the interrupted current.

The time after the injury at which the operation should be performed is of great importance at the present time. The majority of operations necessary as the result of war injuries of nerves have to be carried out through tissues which have been infected and in which suppuration has often been prolonged. *At least* six weeks should elapse between the *sound* healing of the wound and any operation on a nerve. Unless sufficient interval has elapsed, infection occurs, preventing complete success.

It is extremely important to attempt to estimate the probable extent of recovery. From the motor standpoint, if great wasting with contracture has occurred, as is so common after ulnar injuries, operation is not worth undertaking; if there is no contraction on stimulation with the constant current on several examinations, suture is useless. The length of time irritability persists varies, but I have obtained response twenty years after division. But if trophic ulceration is present, operation will cure it and prevent recurrence, for protopathic recovery is almost certain, and ulceration, as Head and the writer have shown, ceases on the restoration of protopathic sensibility.

Considerable interest attaches to the commencement of the first signs of restoration of sensibility. From time to time instances of 'rapid' return of sensibility after secondary suture have been recorded by many observers, among the more recent being Ballance[13] and Kennedy.[14] I have examined for it after operation in fifty-three personal cases, but have not yet observed it. My attention has more than once been drawn by hospital residents to the 'rapid return of sensibility to prick, after secondary suture, which, on careful testing in the usual manner, proved to be deep sensibility. In one patient upon whom I had performed secondary suture of the median nerve, he says said that sensibility to prick had returned on the day following operation. On testing, I found that he complained of pain on pressure, but could not distinguish the sharpness of the point of a pin: it was felt as pressure, and produced the same sensation, as pressure with the blunt end of a pencil; moreover, he was entirely insensitive to

the painful uninterrupted current, and all temperature appreciation was absent. There was no doubt that the pain was that caused by deep pressure, which could be readily evoked before operation.

The time of commencement of the first sign of sensory recovery is much less doubtful than after primary suture. The change of the peripheral end has start to regeneration of the nerve been observed at the time of suture. I have seen it occur as early thirty-three days, but much variability obtains, and speaking generally the time necessary for the completion of the first stage is always long, and the interval between the second and third nearly double as long. I have never yet seen perfect sensory recovery after secondary suture except in the case of the [illegible], although I have watched patients for over seven years, and examined them up to eighteen years after suture. In all some difference could be appreciated between the two limbs, including of course, considerable recognition with imperfect appreciation of the compass test. Motor loss [illegible] recovered to better recovery, and therefore [illegible].

Prognosis after Nerve Bridging. Under the [illegible] heading are included all those procedures which are employed to restore anatomical continuity when the ends of a divided nerve cannot be brought into apposition. We have a choice of methods that have been used more or less successfully from time to time. These are proved [illegible] to be put into [illegible] groups.

1. Transference of a portion of nerve from another nerve (nerve transplantation).

2. Provision of a path [illegible] which [illegible] (tubular suture, flap operations, etc.).

3. [illegible]

4. Shortening the limb by resection of bone.

Nerve transplantation is the operation of choice. In [illegible] I have [illegible] the recorded cases of nerve transplantation [illegible] cases, and [illegible] other operations. Among the [illegible] examples of transplantation [illegible] of [illegible] 3 were [illegible] of a sufficient interval for operation to admit of recovery. This was [illegible] in 2 [illegible] transplantation of nerve [illegible] at the lower [illegible] transplantation. He was operated at a period [illegible] would have [illegible] of some recovery [illegible] most 2 [illegible] example [illegible].

Tubular suture [illegible] of providing a path for the nerve [illegible] free from [illegible] tissue. Many substances have been used for this purpose, among them [illegible] collodion, [illegible] arteries. I prefer a tube composed of a portion of [illegible] the patient's superficial veins. In performing this operation the nerve is prepared and both ends are [illegible] a portion of superficial vein of appropriate size is [illegible] and slipped over one end of the nerve. The ends are [illegible] with catgut, the vein is drawn over the [illegible] and the other end [illegible]. Catgut [illegible]. The

[illegible] to the operation are superior to those obtained from [illegible] instruments.

The results of these operations have been extremely satisfactory.

The possibility of diagnosing [illegible] lesions, allowing the [illegible] of investigation of [illegible] cases, [illegible] operations and [illegible] [illegible]. In some instances an attempt is made to bring the [illegible] of the affected nerve into [illegible] contact with some of those of the sound nerve [illegible] the [illegible] and of the affected [illegible] [illegible] with the central portion of a divided [illegible] nerve.

Including the cases in which the operations were performed by [illegible] I collected 25 examples, of these 12 were reported at a [illegible] time after operation to enable an opinion to be [illegible] as to the results. Two were [illegible] [illegible] successful. Four [illegible] and improved by the operation and were generally [illegible] [illegible] the results are [illegible] to enable a definite opinion to be given. Four out of the 12 cases reported [illegible] [illegible] the operation [illegible] 2 were failures, some improvement took place in all the others. This is a better record than that given by Powers, who considered that 30 per cent were successful.

The prognosis in cases of bone-shortening is that of secondary [illegible].

Incomplete Lesions of Nerves

In order to understand the consequences of these injuries, their [illegible] must first be considered.

In wounds of nerves which do not completely sever the [illegible] it is found that at least a third of their diameter may be destroyed without [illegible] and [illegible] of one of the [illegible] nerves may [illegible] the injury is seen. The least at which a branch is [illegible] will [illegible] the symptoms resembling those of division of that branch.

Thus, continued by the experiments of Bernstein and Hunter, it was found that the fibres in a peripheral nerve which go to make up one branch, be and be [illegible] [illegible] [illegible] at least the [illegible] branch. In certain situations, also, for example, in the anterior [illegible] division of the fifth cervical nerve, the nerve fibres are [illegible] in a well-defined order, and necessitate division of the [illegible] [illegible] division of those [illegible] which supply [illegible] muscles. Again, in the front of the great [illegible] nerve, the [illegible] internal popliteal [illegible] [illegible] complete division of the great sciatic nerve, [illegible] respects [illegible] of the external or internal popliteal nerve.

In [illegible] wounds of nerves, in addition to the incomplete [illegible] [illegible] [illegible] [illegible] [illegible]. The result of the transient compression of the [illegible] nerve trunks by the cutting [illegible] of effused blood.

Absence of symptoms in many cases is due to the fact that these

[illegible]

Subcutaneous Injuries. These generally prognosis is much more favorable than after nerve section, except in the case of traction injuries of the brachial plexus.

A blow, a fall, or pressure [illegible] on sudden [illegible] the [illegible] symptoms of complete severance, may develop. When, the [illegible] and physiological recovery usually ensues. All forms of [illegible] injuries [illegible] the power of localization, [illegible] after [illegible], is rapidly restored. With regard to motor [illegible], unless the [illegible] of degeneration develop, [illegible] is quickly [illegible] to the affected muscles. [illegible] stimulation is usually perfect within [illegible] days.

[illegible] muscles are still paralyzed, [illegible] should be taken. If at this date the muscles [illegible] the uninterrupted current, [illegible] the reactions of incomplete [illegible] treatment should be continued. Recovery can be considered expected in the better cases in a few weeks, in the latter in a few months. If the reaction of degeneration develop, the prognosis is unfavorable, [illegible] operation becomes necessary, with all the

[illegible] of secondary nature. [illegible] has been [illegible] [illegible].

Injury to Terminal Branches

The commonest symptom of the involvement of the terminal branches of a nerve in scar tissue is either a pain referred to the distribution of the trunk from which the affected nerve arises, with spasm and cramps of [illegible]. In [illegible] these symptoms are [illegible] [illegible].

The prognosis is good in this condition, recovery [illegible] is [illegible], when the pain and tenderness are still localized at the seat of injury. When they have spread to other nerves, or are associated with hysteria or muscular affections, it is [illegible] prognosis.

If the pain is not relieved or recurs, no further local operation should be done if the first was thorough. Recovery, according to the [illegible], operative treatment in these cases depends on [illegible]. Weir Mitchell treatment must be tried after removal of all cause for worry. It is useless treating advanced cases while compensation proceedings are pending. Weir Mitchell treatment must also be adopted after operation in the cases complicated by hysteria. When muscular symptoms are present, the affected muscles must be kept relaxed by suitable apparatus and daily massage given until voluntary power returns. It is often twelve months before muscular recovery is complete.

At the present time we are all familiar with these symptoms after amputation of the limbs for war injuries. In many of these [illegible] no attempt can be made to cut the nerves short, so that the [illegible] of painful stumps is not to be wondered at. Both the excision and the [illegible] of the nerve well above the seat of the [illegible] give good immediate results. The prognosis of the former is, however, better, as in the latter the cause of the pain usually remains to re-establish it after the effects of nerve-blocking have passed off.

Special Nerves

Facial. The nerve may be injured as the result of fracture of the base of the skull primarily or from involvement in callus, and during the course of mastoid operations, during operations in the parotid or submaxillary regions, or from forceps pressure during childbirth.

When injured as the result of fracture, whether involved primarily or secondarily, the division is usually incomplete, and perfect recovery occurs in about three months. Facial paralysis following operations on the middle ear is [illegible] due to incomplete division. Spontaneous recovery is usual in the majority of cases, but may take twelve months. The incomplete facial paralysis, which may occur as the result of operations in the submaxillary region, is rarely permanent if the wound heals by first intention.

Careful electrical testing is necessary in order to enable an opinion to be given with regard to the necessity of operative treatment. If true reaction of degeneration develops, no time should be lost, but operation carried out.

In but few cases is it possible directly to unite the divided ends of the nerve; nerve anastomosis is necessary.

The best results are given when, as first suggested by Körte,[18] the hypoglossal is used and the anastomosis is of the partial peripheral type. The prognosis varies with the cause of the paralysis, being better when the division results from injury than when it is the result of neuritis. Suppuration of the operation wound renders success doubtful.

The first sign of recovery usually appears about the third or fourth month, the face while at rest becoming more symmetrical, although there is no return of voluntary power. A few weeks later it is noticed that the angle of the mouth can be moved, at first only with movements of the tongue; then the muscles of the upper lip, and finally those of the forehead. With exercise, the movements become dissociated, and finally emotional movement may return.

For a few weeks after operation, the side of the tongue is paralyzed, causing difficulty in speech and deglutition; this passes off, but the affected side may remain smaller for a considerable time.

In forty cases collected by the writer improvement occurred in all reported at a sufficiently late date; but in comparatively few did emotional movement return, the face on the side of the injury remaining immobile in smiling. It is safe to say that in the majority of cases the appearance of the face at rest will become normal.

Recurrent Laryngeal Nerve. This nerve is not infrequently injured in operations upon the thyroid gland. The paralysis is usually temporary, and disappears within three months. If at the end of that time recovery has not taken place, operation offers a good chance for recovery. In the first case of secondary suture recorded (Shelton Horsley[19]), recovery was almost perfect fifteen months later.

Brachial Plexus. It is now well established that the prognosis of injuries to the brachial plexus, taken as a whole, is worse than those elsewhere, although, as noted by Bardenheuer,[20] and more recently by Winnen,[21] the seriousness has been exaggerated.

Von Bruns[22] found that while spontaneous recovery ensued in 66 per cent. of subcutaneous injuries of peripheral nerves, only 26 per cent. of similar plexus injuries got well spontaneously. Warrington and Jones,[23] from the examination of cases under their care, found spontaneous recovery in 30 to 40 per cent. Winnen 30 per cent. with 70 per cent. improvement. These unfavourable figures are due in part to the nature of the injury. In a large proportion of cases the nerves are overstretched, and this results in haemorrhage into the sheath and consequent fibrosis; in addition, if it leads to rupture the fibres give way at different levels; hence spontaneous recovery

is unusual when the signs of complete division are present, and is apt to be imperfect in cases of incomplete division. Again, it is possible that the injury in some cases tears the roots away from the cord. Even after operation, the prognosis is not so good as for example, after secondary suture of the median at the wrist or the musculospiral. This has to do to a great extent with the length of time necessary to complete recovery: in many cases the patient ceases to attend for efficient after-treatment, and when recovery of the nerve has finally become complete, the muscles are atrophic and contractures of the opponent muscle render the regeneration of the nerve futile.

Brachial Birth Paralysis. The prognosis is favourable if efficient treatment is adopted from the time of birth. Perfect recovery has taken place in 70 per cent of the cases under my care: but in these lesions particular care is necessary in order to prevent overstretching of the paralyzed muscles and over-action of their opponents. Unless this is carefully attended to, although the nerve recovers completely, the child is left with a damaged limb. This point has recently been emphasized by Fairbank,[21] who has devised an efficient splint for the purpose.

With regard to operation: this is necessary only in a minority of the cases. If at the end of three months from birth the reaction of degeneration is present, operation should be carried out as soon as convenient. If it is possible to excise the damaged portion of nerve and perform end-to-end suture, the outlook is favourable: but when this is impossible and nerve anastomosis becomes necessary, perfect recovery is unlikely to take place.

Post-anæsthetic Brachial Paralysis. These injuries of the plexus are by no means uncommon, although published cases are few. Cotton and Allen[25] in 1903, were only able to collect thirty from the literature. It occurs in patients in whom, during the course of operation, the arms are abducted and externally rotated or raised above the head. The right arm is usually affected. Stretching over the head of the patients with the arms elevated above the head is the probable cause of the infraclavicular injuries. In all cases the lesion is incomplete, corresponding to the slight violence which produced it.

The prognosis is good: all the cases that I have had under observation have recovered completely without surgical intervention, and so have all except one of those collected by Cotton and Allen.

Injury due to Presence of a Cervical Rib. A cervical rib is by no means an unusual cause of injury to the brachial plexus as the result of long-standing pressure. In cases in which the nervous symptoms are severe, removal of the rib is the only treatment. The result of this is on the whole good. As in other cases in which muscles are affected as the result of prolonged nerve-pressure, the question of perfect recovery will depend upon the extent of the wasting and deformity produced. When this is well marked, some atrophy and [illegible] always remains.

The nervous symptoms fall into two groups, paralytic and neuralgic. As a rule these co-exist. The subject has been fully discussed at the Royal Society of Medicine.[28] Thorburn reported 20 cases (14 personal), and came to the conclusion that pain was relieved in four-fifths; paralysis cured in certainly one-half. Sargent, as the result of operation on 29 cases, speaks of "the most gratifying immediate results obtained in those cases in which pain had been the prominent feature." Hinds Howell collected the after-results in 25 cases, and came to the conclusion that "in the majority of cases pain will be relieved or cured. With regard to muscular weakness and atrophy, the expectation is that the operation, if it is not too long delayed, will greatly improve the condition." (*See* CLAVICAL RIB.)

It was pointed out that a paralysis of the brachial plexus may occasionally occur as the result of operation, but if performed by those skilled in the procedure is unusual and transient.

Operative treatment undoubtedly removes the most distressing symptom of this condition.

Circumflex Nerve.—Injury to this nerve is unusual and is usually subcutaneous, the result of pressure of the dislocated head of the humerus or a crutch, and results in an incomplete physiological division. Treated on the usual lines, recovery ensues as a rule, but is generally slow. Even if the paralysis persists, operation is not often necessary, for the supinators and clavicular fibres of the pectoralis major acting with the trapezius may compensate for its loss.

Ulnar Nerve.—The prognosis in cases of injury to the ulnar nerve depends upon the care taken to prevent the development of claw-hand. If in cases of incomplete division or after primary suture a suitable splint is worn, perfect recovery may take place, although it is unusual in the latter.

Perfect recovery never ensues after secondary suture, or releasing the nerve from pressure in case of injury the result of old deformity of the elbow or long-standing dislocation. Some weakness of the intrinsic muscles of the hand always remains.

Musculospiral Nerve. The prognosis is more favourable than after injury of any other nerve. It supplies no important area with sensibility, its muscles are none of them intrinsic. Most of its injuries are subcutaneous, resulting in incomplete physiological division. If treated by relaxation of the paralyzed muscles, recovery is rapid, and usually perfect within three months. When operative treatment is necessary to free the nerve from injurious pressure, restoration of function usually commences in a few weeks. After secondary suture, motor power usually returns in nine to twelve months, and perfect [illegible] within eighteen.

REFERENCES.—[1]*Clin. Jour.* 1903, Nov. 13; [2]*Traité des Sections Nerveuses*, Paris, 1873; [3]*Jour. Physiology*, xiv.; [4]*Injuries and Diseases of Nerves*, London, 1889; [5]*Brain*, Summer No. 1905, cx; [6]*Lancet*, 1906, Mar. 17, 24, 31; [7]*Zentr. f. Chir.* 1913, No. 31, s. 1222; [8]*Loc. cit.*; [9]*Brit. Med. Jour.* 1904, ii. 1065; [10]*Lancet*, 1902, ii. 198; [11]*Brit. Med. Jour.* 1871, ii. 640; [12]*Bull. et Mem.*

Soc. de Chir. 1905, xxii, 471 ; [11]*Trans. Roy. Med. and Chir. Soc.* 1902, 290 ; [12]*Phil. Trans. Roy. Soc.* 1897, 188 B, 257 ; [13]*Edin. Med. Jour.* 1906 Oct ; *Ann. Surg.* 1904, xl, 632 ; [17]*Archiv. gen. de Med.* 1905, No. 11 ; [18]*Deut. med. Woch.* 1903, No. 17 ; [19]*Ann. Surg.* 1910, i, 524 ; [20]*Archiv. f. Chir.* 1909, Bd. 89 ; *Deut. Zeits. f. Chir.* 1912, Bd. 118, s. 416 ; [22]*Neurol. Centr.* 1902, s. 1042 ; *Lancet*, 1906, ii, 1644 ; [24]*Ibid.* 1913, i, 1219 ; [25]*Boston Med. and Surg. Jour.* 1903, cxlviii, 499 ; [26]*Proc. Roy. Soc. Med.* 1913, vi, No. 5, Clin. Sect. 113 127

James Sh[illegible]

NEURALGIA, TRIGEMINAL.—We shall only consider here the prognosis of the severest form of neuralgia, tic douloureux, and shall assume that ordinary medical treatment, and the examination of the teeth, nasal accessory sinuses, etc., has proved abortive. The neuralgia is severe in character, comes on in occasional paroxysms, and shows no tendency to spontaneous cure.

The methods of treatment, then, with which we have to do, are (1) *The peripheral neurectomies*; (2) *Alcohol injection*; and (3) *The removal of the Gasserian ganglion* by the Hartley-Krause method.

1. **The Peripheral Neurectomies** such as removal of a piece of the lingual and inferior dental nerves, excision of the intra-orbital nerve, or the Braun-Lossen operation on the second division of the trigeminal nerve, are all comparatively safe, so far as the immediate risk to life is concerned; they have the very serious drawback that permanent cure by their means is most exceptional; and when it does occur, it is always open to suspicion that some peripheral dental or other cause, capable of simple treatment, has been overlooked. Out of 43 cases treated by neurectomy, the average duration of relief from pain was ten months (Putnam and Waterman).

2. **Alcohol Injection** into the Gasserian ganglion is somewhat difficult of technique, and it may not be possible to reach the desired spot; but it appears to be perfectly safe, so far as risk to life is concerned. Even if the injection is made by mistake into the subdural space, nothing worse than a headache results. The relief given, if the alcohol can be correctly placed, is very marked, and lasts for a long time, even if it is not permanent; there is usually complete freedom from pain for many months or years. Harris was able to give this relief in 80 out of 86 cases. The test of success is the production of immediate anæsthesia in the whole distribution of the fifth nerve. The injection can be repeated, if recurrence takes place, with equally good results.

Härtel followed up 25 cases, 15 for more than six months; of these 15, 9 were free from pain and 6 relapsed. A serious trouble is that keratitis may result; this took place in 6 out of the 25 patients, and one eye had to be enucleated. Possibly covering the eye may give better success.

I have had several very successful cases. In one of them there was some temporary facial palsy.

Removal of the Gasserian Ganglion is, no doubt, a serious operation, but the mortality, in skilful hands, is not as high as is commonly supposed. Horsley, Hutchinson, and Krause together report a death-rate of 4 per cent. Some years ago, Horsley had operated on 120

patients with 6 deaths. Rawling puts the mortality at 5 per cent. Very possibly it may be higher in the practice of those who have seldom or never performed the operation.

The relief appears to be certain, complete, and permanent.

Here again there may be trouble with the eye. Härtel shows that keratitis has followed in 30 out of 207 successful removals of the ganglion. Hirt is about 15 per cent.

REFERENCES.—Harris, *Lancet*, 1912, i, 218. Hirt, *Deut. Zeits. f. Chir.*, 1914, xxx, 129.

J. *Purves Stewart.*

NEURITIS. There are two great groups into which cases of neuritis are classified: (1) *Multiple or peripheral neuritis*, where many or all of the peripheral nerves are involved; (2) *Local neuritis*, where only a single nerve, or portion of a nerve, is affected.

1. Multiple Neuritis or Polyneuritis.—In most cases this is due to some poison. This poison may be introduced from without, as in the cases of alcohol, arsenic, lead, or (less commonly), mercury, phosphorus or copper; or it may be the result of micro-organisms producing specific diseases, or of their toxins, as in diphtheria, influenza, malaria, septicæmia, gonorrhœa, beri-beri, leprosy, syphilis. Multiple neuritis may also be produced by poisons arising within the body, as in diabetes, pregnancy, etc.

Of these varieties, the commonest of all is alcoholic polyneuritis. It is unnecessary to describe the clinical features of this disease. Its onset is insidious, and the symptoms may take weeks or months to attain their maximum intensity. If the alcoholic habit continues, the neuritis persists indefinitely, until the patient becomes bedridden, contractures of the limbs develop, especially in the feet; and the patient dies, sooner or later, from some intercurrent malady, usually of pulmonary origin. If however, the poison be withdrawn, and if massage and electrical treatment are then assiduously carried out, the symptoms may even continue to increase for two or three weeks, before coming to a standstill. There is then usually a stationary period of one or two months before signs of improvement begin to appear. Then the pains and the hyperæsthesia gradually diminish, the cutaneous anæsthesia clears up, and the motor paralysis recovers in from four to six months from the time of onset of improvement; the proximal muscles recover before the distal. Last of all, the deep reflexes return; a patient may have complete sensory and motor recovery for weeks or months before the deep reflexes reappear.

The *prognosis as to life*, in a case of multiple neuritis from any cause, depends on various factors. The motor, rather than the sensory, symptoms are of significance in this respect. The more rapid the onset of paralytic symptoms, the more dangerous is the case. When the symptoms have attained a considerable severity within a few days, there is a grave risk of extension to the respiratory muscles. Implication of the diaphragm and intercostals greatly increases the seriousness of the case, more especially if the cardiac muscle be enfeebled, as is so

[illegible] the case. Patients with multiple neuritis have a particularly [illegible] power of resistance to pulmonary infections, whether by the tubercle bacillus, the pneumococcus, or other organisms: and the presence of lung complications, even a simple bronchitis, is always a serious matter in such patients.

A characteristic form of mental affection, known as *Korsakow's psychosis*, occurs in some cases of polyneuritis. Its symptoms are those of mild mental confusion, especially with regard to times and places, together with impairment of memory for recent events: so that a patient who is bedridden from polyneuritis may give descriptions of recent long walks which she has taken (the patient is usually a woman), and of the various people and places whom she has thus visited.

The nature of the poison which produces the multiple neuritis has little or no influence *per se* upon the prognosis as to recovery. The different forms of polyneuritis run a similar course. A great deal, however, depends on whether the source of the underlying poison, once it is recognized, has already been removed, as in diphtheria or septicæmia; whether it can be cut off with ease, as in lead or arsenic; whether there is a tendency to relapse, as in alcohol; or [illegible], whether it cannot be removed, as in diabetes, cancer, leprosy, etc.

2. **Local Neuritis.**—Recognition of the underlying cause, and its removal, if possible, are the first essentials in every case of local neuritis. Thus, in a neuritis due to local pressure (e.g., by crutches, callus from old fracture, cervical ribs, tumours, etc.) the underlying cause can sometimes be removed. In other cases, the exciting cause has already produced its effect on the nerve trunk, and we have to deal with the result (e.g., in local neuritis due to bruising or inflammation of the nerve, or to exposure to cold). In other cases still, we have to do with a disease which produces a primary degeneration of the nerve fibres (e.g., in diabetes, malaria, enteric fever). In a still further class, the fibrous tissues of the nerve trunk, its sheath or perineurium, are primarily attacked, and the degenerative changes are secondary (e.g., in gouty, syphilitic, and leprous neuritis). The prognosis, then, of any individual case of localized neuritis is that of its underlying cause.

Electrical Reactions.—In cases of local neuritis of a mixed nerve, where sensory and motor phenomena are present, sensory functions generally recover before motor, although this rule is not without its exceptions.

With regard to motor paralysis, the prospects of recovery are best estimated by a careful study of the electrical reactions. To make an accurate prognosis, however, the motor paralysis must have lasted at least ten days, to allow time for degenerative changes, if any, to have developed. If, after ten days or a fortnight of motor paralysis, we find the typical 'reactions of degeneration'—i.e., total loss of the excitability, with reversed polar reactions and a slow, sluggish

response to galvanism, the degeneration of the nerve fibres is complete, and recovery will not commence for three months at least, possibly not for a year; and even then, if recovery ultimately sets in, it will probably be imperfect and associated with a certain amount of contracture. If, on the other hand, the electrical reactions are normal to faradism and galvanism, or if there be merely a quantitative diminution, without polar changes, recovery may be expected to begin in from three to six weeks from the onset of the paralysis. Sometimes we meet with partial or incomplete reactions of degeneration, consisting in a sluggish contraction to galvanism, with reversed polar reactions, but with preservation of a certain amount of faradic response. In such cases, we may expect improvement in from six to eight weeks from the onset of the paralysis. Examination of the reaction of the muscles to *condenser discharges* is a valuable addition to faradic and galvanic stimulation as a means of electrodiagnosis and prognosis. A healthy striated muscle fibre reacts to condenser shocks of the smallest condensers (e.g., 0·01 to 0·12 microfarads), with the shortest and fastest wave lengths, whereas a degenerated muscle requires larger condensers (e.g., 0·50, 1·00, 2·00, or even 3·00 microfarads), with longer and slower wave lengths. *Francis Stewart.*

ORCHITIS, TUBERCULOUS. (See EPIDIDYMITIS, TUBERCULOUS.)

ŒSOPHAGUS, STRICTURE OF. Stricture of the œsophagus may be (1) *Functional* (*cardiospasm*); (2) *Simple*, usually due to scar contraction after swallowing a corrosive; (3) *Malignant*.

1. **Cardiospasm**, a condition in which the entrance into the stomach is tightly contracted, whilst the œsophagus above may be largely distended, is rare. It may be recognized by the œsophagoscope and by a skiagram after a bismuth meal. It persists for years, apart from treatment, and shows no tendency to spontaneous cure. Dilatation, by various complicated means, usually gives a good result.

2. **Simple Stricture**, due to scarring, may be recognized by the history, by skiagram, by the failure to admit a bougie, and by the glistening white appearance without ulceration seen with the œsophagoscope. At least 9 out of 10 of the cases can be dilated up by bougies, passed, if necessary, by the aid of the œsophagoscope. If this fails, a temporary gastrostomy will often allow of successful retrograde catheterism; or, in a week or two the rest to the œsophagus allows of a bougie being passed. Dilatation of the stricture has to be kept up for many years at regular intervals. Oser reports on the cases treated at Vienna during ten years. Out of 47 patients, 27 were treated by dilatation, with 21 cures and 1 death; 14 by gastrostomy and retrograde catheterism, with 10 cures and 1 death; 6 by gastroenterostomy, etc., for burns of stomach, with 5 cures and no deaths; the other patients were unimproved, or lost sight of.

3. **Malignant Stricture**, of course, has a hopeless outlook. Apart from gastrostomy, the duration of life is usually not more than six

months from the onset of dysphagia; that operation prolongs life a few months. A good many deaths, and one success, have followed excision of the growth.

REFERENCE.—*Surg., Gyn. and Obst.* Abstract, 1913, xvi, 17.

A. Rendle Short.

OSTEITIS DEFORMANS (PAGET'S DISEASE). Of this rare disease there are not many more than a hundred cases recorded, but most surgeons of experience can recollect one or two others which have not found their way into print. It is a chronic incurable affection which may not shorten life.

The strange feature of the prognosis is the considerable probability that a malignant bony growth will eventually appear. Of 34 cases followed to their termination, this was the cause of death in 12.

REFERENCE.—Elmslie, *St. Bart's. Hosp. Rep.* 1908, 121. *A. Rendle Short.*

OSTEO-ARTHRITIS.—(*See* ARTHRITIS DEFORMANS.)

OSTEOMALACIA. This disease appears to be more commonly met with on the Continent and in some parts of India than in England or America. It affects young women for the most part, though a few cases are recorded in males and in children. The outlook is very grave. According to the older authorities, it goes on in most cases to a fatal termination in from two to ten years, the patient being bedridden most of the time. Durham records 22 out of 145 cases in which natural recovery, more or less complete, was observed. It is most unfavourably influenced by pregnancy, and is often first recognized at that time. As is well known, the pelvis becomes very contracted, and Cæsarean section will probably be required. The child is normal. Many of the mothers have died in childbirth.

In a small number of cases, double oophorectomy has been performed, and there is some evidence that this improves the outlook. Fehling reports 14 cases: 6 of these were cured for three years or more: 2 were better for a time and then relapsed; the rest died or were lost sight of. Other observers have recorded temporary benefit with relapse following.

There are a few cases known in which great benefit followed adrenalin injections.

REFERENCES.—Durham, *Guy's Hosp. Rep.* x., 1064; Knipe, *Amer. Jour. Obstet.* 1912, lxv, 582.

A. Rendle Short.

OSTEOMYELITIS.—It is not easy to estimate the prognosis of such a disease as this in formal terms, for any bone may be affected, and with every degree of severity.

Prognosis as to Life.—In many cases there is very considerable danger to life. The rare infections of the skull and vertebral column are almost fatal, and the majority of young children with perforation into the joint (Sir T. Smith's *Acute Arthritis of Infants*) also die.

Even with the commoner affections of the long bones there is grave risk. During the years 1901 to 1910, at the London Hospital 34 per cent of the patients died; the usual causes of death were endo- or pericarditis, empyema, or abscess of the lung. Others die of cachexia at a later date.

Signs of danger are: extension of the infection over the whole length of a large bone such as the femur or tibia, involvement of the hip-, knee-, or ankle-joint, multiple bone involvement, rigors, and signs of trouble in the chest. In chronic cases, great wasting and cachexia, apart from efficient treatment, point to a probably fatal termination.

The younger the patient the graver the outlook. Early and thorough surgical intervention is of the utmost importance in the acuter types of the disease.

Prognosis as to Limb. Very early operation, laying open the whole infected area, will avert the long illness which necrosis necessarily involves. Unfortunately the surgeon is generally too late, and part of the bone will die. In the worst cases, the periosteum is rapidly stripped up and the osteoblasts are killed, so that no regeneration of bone will take place. This is the rule in necrosis of the lower jaw. Usually, however, an efficient new bone is formed in time; but it takes months for the sequestrum to separate, and again, after that is removed, for the sinuses to close. It is likely to be from six months to a year or more before the patient is well.

Necrosis of the popliteal plate of the femur is a very trying condition for all concerned, as the separation of the sequestrum may take an interminable time. Many of the cases are cut short, at last, by an amputation, on account of failure of the general health. If the knee-joint is involved it is usually necessary to amputate, but I have seen one such case, infected from the femur, in a fair way to recovery.

Sometimes an attempt is made to avoid amputation by exsecting the tibia, leaving only the epiphyses. New bone is regenerated, but in my experience the limb is useless, and in one of my cases a pyæmic infection of the other hip took place.

REFERENCE.—Kennedy, *Brit. Med. Jour.* 1912, ii, 114. *A. Rendle Short.*

OVARIAN TUMOURS.—The prognosis in ovarian tumours is very largely dependent upon the nature of the growth. With the exception of certain adventitious accidental phenomena which we shall consider later, the outlook is good, doubtful, or bad according to the histological characters. At the outset, it cannot be too definitely asserted that naked-eye characters alone are an insufficient guide; and in no region of pathology are the services of an expert histologist, experienced in the study of ovarian tumours, more valuable than in expressing an opinion upon such a growth; even under the microscope, there are certain cystic-solid tumours on which it is difficult to express a decided opinion.

The relative proportion of benign to malignant tumours varies considerably; thus Macnaughton-Jones[1] collected the figures from

German clinics, and in a series of 2893 cases only 11 per cent were reported as malignant; while Mrs. Scharlieb[2] found 16·6 per cent malignant out of 150 cases, and Glendining[3] found 17 per cent carcinomatous out of 106 cases occurring in the Chelsea Hospital for Women in the years 1908 and 1909.

From the point of view of prognosis, we have always been in the habit of dividing ovarian tumours into three groups: (1) *The simple* (forming the largest section); (2) *The semi-malignant*; and (3) *The malignant*.

1. **The Simple.**—In the simple uniocular ovarian cysts, the results of operation are good: probably there is no more uniformly successful operation in surgery. A small proportion of cases have to be opened once again owing to lipping of the ligature round the pedicle, and occasionally such a case is lost. This accident usually results from ligaturing a large pedicle together with a piece of the broad ligament, so that when the uterus is pulled on or displaced, a portion of the ligated tissues tends to be withdrawn. A more remote accident occasionally follows failure to bury the stump of the pedicle; in such a case the sequence of events is the formation of a band, the passing of gut under the band as in hernia, and eventual strangulation.

2. **The Semi-malignant.**—This variety comprises those ovarian tumours known as proligerous cystadenomata and papilliferous ovarian cysts. In these cases, the chief difficulty arises in excluding malignancy, as many of them simulate columnar-cell carcinoma very closely. They are here distinguished from the properly malignant cysts because they do not show true metastases; secondary masses are the result of contact implantation; they are practically never found outside the abdominal cavity unless they occur in the scar of an abdominal incision; and they do not invade the lymphatic glands.

The presence of secondary nodules on the peritoneum, omentum, or intestine is not to be taken as indicating hopeless malignancy. Thomlin[4] has recorded cases in one of which there were vegetations all over the peritoneum, and yet at the end of four years the patient was apparently well and cured; while in another case, having to leave a tumour the size of a hazel nut in the pouch of Douglas, he was able to assert three and a half years later that this mass had not increased in size. Pozzi[5] says that he has himself observed that vegetations present on the intestines at the first operation were absent at a second operation.

The presence of ascites, although obviously a grave complication, is not to be regarded as hopeless, as numerous observations have been made in which the ascites was not necessarily fatal. The gelatinous fluid often encountered in some cases in this group must be taken as grave, but is indicative of the semi-malignant character. The ordinary rules as to recurrence in malignant growths scarcely apply to the cases belonging to this group. Thus, Pozzi[5] operated on a young girl with enormous ascites, and removed double papillomatous ovarian cysts; after twenty years the growth took on malignant characters, and the

patient did not survive the second operation more than eighteen months. Such an observation, although extreme, is typical of many cases, and leads to the conclusion that in some instances the growths take on a more malignant nature.

The clinical characters of the more malignant tumours in this group are: rapid and sudden enlargement, rapid loss of weight with cachexia, extensive fixation to neighbouring viscera and structures, considerable œdema of the limbs and abdominal walls when the volume of the tumour and the amount of ascites is taken into consideration, and, finally, the presence of pleurisy.

The operative results in these cases are not good. Thus, in Mr. Scharlieb's[2] series, the immediate mortality (within a month of operation) was about 15 per cent, and at least 50 per cent were known to have died within three years. There seems to be no doubt that many cases in this group, if caught early before dissemination has occurred, are comparatively successful; when ascites and secondary vegetations are observed, it is still advisable to remove both ovaries if possible, as although the condition is ultimately almost certainly fatal, yet in some cases life is prolonged for years.

Many cases will require tapping from time to time, in order to relieve the intra-abdominal tension. This simple operation has been performed a considerable number of times—over a period of years in some cases.

3. **The Malignant.**—The third group includes malignant tumours, whether cystic or solid. In these cases the outlook is not promising. If at the time of operation there is no evidence of secondary spread (as shown by vegetations on the peritoneum, and the presence of free fluid) the prognosis is generally regarded as better; but it is surprising how often such cases return with metastases within the year; the original diagnosis was that of an endothelioma or cystadenoma, but in the light of subsequent history it has often to be changed to one of adenocarcinoma.

Kachel[6] reports that of all malignant ovarian tumours upon which operation is performed, only 20 per cent are alive after two years, and that a considerable proportion of these cases have extensive recurrences of growth.

Secondary Changes. *Axial rotation* occurs in about 2 per cent of cases of ovarian cysts, but generally is much more common in dermoid tumours and in cysts of medium size and ovoid form. The operative results are uniformly good, provided infection and necrosis have not occurred.

Infection most commonly occurs following an axial rotation. Provided the case is seen before extensive peritonitis has occurred, the results are good, if drainage is employed for a few days in all cases showing any rise of temperature.

Later results following mild infection of the ovarian tumour are seen in dense peritoneal adhesions, rendering operation tedious and difficult, and greatly increasing the risk.

Rupture was found by Spencer Wells, in a series of 1000 cases, to take place in 2·4 per cent, but this figure appears abnormally high. In the majority of cases rupture is caused by rough examination [illegible] on broad-ligament cysts, and is attended by no ill effects. In a few cases, however, papillary cysts and dermoids rupture, causing dissemination of vegetations or dermoid structures.

Ovarian Tumours and Irradiation.—Ovarian tumours have been treated by *x* rays on the assumption that fibroids were under treatment, with the result that shrinkage has been described in one or two instances, but no record of complete disappearance exists. Kelly and Burnam[7] record a case of an ovarian cyst which, one year after 60 mgrms. of radium had been applied for forty-seven hours, showed a reduction in volume from 8 to 14 inches in diameter.

Ovarian Tumours and Pregnancy.—The questions of operative interference and the result to be expected therefrom have special importance when pregnancy is complicated by the presence of an ovarian swelling. The inclination both of the medical attendant and of the patient is to postpone any operative interference; but the following figures, taken from a statistical article by Barrett,[8] point conclusively to the conclusion that the operative line of treatment is much the better course. He gives the results in 114 cases. Of these, 76 were operated upon before term: the maternal mortality is given as 1·3 per cent, and abortion or premature delivery occurred in 12 per cent; in 8 cases double ovariotomy was performed, and in six of these cases pregnancy continued to term. The other 38 cases were treated expectantly, and were not operated upon before term: the maternal mortality was 18·4 per cent; of the total 38 cases, 7 escaped operation, but 4 of these died, and the remaining 3 still have their cysts.

Prognosis of Ovarian Cysts apart from Operation.—In the absence of operative treatment the question of the prognosis is more difficult. It is necessary to refer to older writers, such as Spencer Wells,[9] who had occasion to see numerous patients who refused operation. He asserted that when the cyst had attained such a volume that the general health was affected, the duration of life would not exceed two years, and that these two years were full of misery, pain, and despondency.

On the other hand, T. P. Franck records a case of cyst known to exist at the age of 13, and still present at 88 years of age. Also cysts have been known to exist for twenty-five and even fifty years, but were generally of dermoid nature.

REFERENCES. [1]*Proc. Roy. Soc. Med.* (Obst. and Gyn. Sect.), 1910, i, 97; [2] [illegible] 87 et seq.; [3] *Ibid.* 96; [4] *Med. Times*, 1881, i, 243 and 275; [5] *Traité de Gyn.* ii, 933; [6] *Centr. f. Gyn.* 1907, li, 1603; [7] *Jour. Amer. Med. Assoc.* 1914, ii, 622; [8] *Surg. Gyn. and Obst.* 1913, Jan.; [9] *Ovarian and Uterine Tumours*, 1882.

Bryden Glendinning.

PAGET'S DISEASE.—(*See* OSTEITIS DEFORMANS.)

PANCREATIC CYSTS.—Cysts of the pancreas, excluding hydatid and blood cysts, are usually due to pressure upon the pancreatic duct either by chronic inflammation of the head of the gland, or scarring after an injury. This being so, they almost invariably show a steady increase in size which necessitates interference, though they may not at the time be causing any great inconvenience. The usual procedure is to open the cyst, perhaps apply carbolic acid to its interior, plug it with gauze, and drain. To attempt to dissect it out is ordinarily too dangerous to be worth the trouble.

The simple operation for drainage is not very serious. Of 160 cases in the literature collected by Mayo Robson, 20 died and 140 recovered, though 1 died later of diabetes. Of 138 cases cases treated by incision and drainage, 16 died; of 22 treated by partial or complete excision 4 died. Mayo Robson himself had 11 patients, of whom 10 recovered. There is, however, a good deal of trouble occasionally from persistence of the sinus, and the discharge may contain active trypsin which leads to self-digestion and a raw painful condition of the skin about the orifice of the drain. On the other hand, if the sinus closes, in a few cases the cyst has reformed.

A. Rendle Short.

PANCREATITIS. We shall have to consider the prognosis of (1) *Acute pancreatitis*, including the suppurative, haemorrhagic, and gangrenous varieties; (2) *Abscess of the pancreas*; and (3) *Chronic pancreatitis*.

1. Acute Pancreatitis.—By this we mean an acute attack of violent pain in the upper abdomen, with some fever and vomiting and it may be diarrhœa, which is of such severity that an exploratory operation is performed and reveals extensive areas of fat necrosis, and a swollen, inflamed, suppurating, haemorrhagic, or gangrenous pancreas. It is almost impossible to make a diagnosis during life with any certainty apart from the operation findings. It is therefore not feasible to give any account of the prognosis in non-operated cases.

DEATH-RATE AFTER OPERATION FOR ACUTE PANCREATITIS.

Moynihan	11	7	4
St. Thomas's Hospital	16	7	9
Middlesex Hospital	8	2	6
Bristol	7	0	7
Norwich	7	0	7
Körte (literature)	103	41	62
Körte (personal)	34	18	16

Although very grave, the condition is by no means hopeless. Thus Moynihan records 7 recoveries out of 11 operations. At St. Thomas's Hospital, 1907–1911, there were 16 cases with 7 recoveries and 9

deaths; at the Middlesex Hospital 8 cases with 2 recoveries and 6 deaths. On the other hand, at three Bristol hospitals, of 7 cases all died, and Blaxland and Claridge have reported a series of 7 cases all fatal, at Norwich. Körte finds in the literature 103 cases operated on by fifteen surgeons: 41 recovered and 62 died. In his own clinic, 34 patients were treated by drainage of the pancreas: of these, 18 were cured and 16 died. The death-rate is therefore probably about 60 per cent.

The prognosis varies with the following conditions:

a. The Time of Operation.—Thus Körte relates: Operation in first week, 12 cases, 8 cured, 4 died; in second week, 4 cases, 3 cured, 1 died; operation in 3rd and 4th weeks, 14 cases, 7 cured, 7 died; operation later, all died. It would appear, however, that Körte's series must include a number of mild cases, because in English practice the patient is frequently dead in a week, whether operated on or not.

b. The Nature of the Operative Interference.—Mikulicz quotes from a series of cases in the literature, where on 36 occasions the pancreas was actively attacked (by blunt puncture, etc.) and drained, 25 recovering and 11 dying; in 41 instances it was left alone, and only 4 recovered. Too much importance must not be attached to these figures, because it is probable that the first group contains less acute cases where a definite abscess was found, and that the latter group would include the gangrenous and hæmorrhagic cases where there is little to be done except put a drain down to the pancreas. In Körte's series, 7 cases were drained posteriorly; of these, 5 died.

c. The Operative Findings.—The gangrenous and hæmorrhagic cases are very grave indeed, and seldom recover (2 out of 15 in Körte's clinic).

When there was acute pancreatitis without necrosis or pus, Körte saved 11 out of 14.

It is difficult to mention a time of average survival, because the patients differ so. In many cases they are ill for less than a week before death terminates their sufferings. Others drag on for a month or more; they are very liable to suffer from self-digestion of the wound, phrenic abscess, or pneumonia. Körte had 7 cases of severe post-operative hæmorrhage, all but 1 proving fatal.

The writer has published a case of acute pancreatitis of the accessory pancreas in the wall of the jejunum, which proved fatal in spite of operation.

2. **Abscess of the Pancreas.** Although grave, the outlook in this group is by no means so serious as in the acute class just discussed. Abscess of the pancreas is generally the late result of a relatively mild attack of acute suppurative pancreatitis. Körte had 7 cases with 5 recoveries. Villar has abstracted from the literature 53 cases of abscess of the pancreas, whereof 33 recovered and 20 died. Some of those who recovered from their immediate trouble were by no means perfectly cured, but eventually developed symptoms of diabetes, cachexia, or extreme wasting.

3. **Chronic Pancreatitis.**—We include here those cases in which there is chronic jaundice and perhaps also pain, the diagnosis from gall-stones on the one hand and cancer of pancreas on the other being difficult if not impossible. We do not, in this section, include those cases in which the classical symptoms of diabetes supervene, but there is always the possibility to be borne in mind, in giving a prognosis, that this disease may eventually declare its presence when there is known to be cirrhosis of the pancreas already present.

It is not probable that chronic pancreatitis will get well, apart from operation, when it has advanced so far as to produce persistent jaundice.

Two methods of treatment are possible, cholecystenterostomy and drainage of the gall-bladder. The operation mortality is given by Mayo Robson as 8 deaths in 113 cases from the literature, so that the true mortality may be about 10 per cent. higher, no doubt, after cholecystenterostomy than after simple drainage. Neither operation can be relied upon to give first-class results: the fistula may fail to close, and if the gall-bladder and duodenum have been short-circuited, sepsis may invade the bile-passages from the bowel. Accurate figures are lacking, but probably the majority of the patients are cured by a cholecystenterostomy.

References. Mikulicz, *Ann. Surg.* 1903, ii, 1; Sampson Handley, *Arch. Middlesex Hosp.* 1912, Feb. 20; Korte, *Ann. Surg.* 1912, lv, 23.

J. Rendle Short.

PAPILLOMA OF THE LARYNX.—(*See* Larynx, Papilloma of.)

PARALYSIS AGITANS.—This is a progressive, but not a fatal malady. Beginning unilaterally in most cases, it may remain confined to the face and limbs of one side for years; but sooner or later the other side also becomes affected with the characteristic rigidity and tremor. Worry, excitement, business anxiety, and strenuous mental exertion all aggravate its symptoms. The rigid, mask-like face, with its expression of unutterable sadness, not infrequently disguises a cheerful, and even a humorous, frame of mind; although, in other cases, the patient becomes depressed by the consciousness of the inveterate nature of his malady.

The intellectual faculties, however, are usually preserved unimpaired, even in the most advanced stages of the disease. By the judicious administration of hyoscine, we can usually mitigate not only the rigidity and tremor, but the characteristic restlessness which is so trying to the patient.

Purves Stewart.

PARALYSIS, BULBAR.—(*See* Bulbar Palsy.)

PARALYSIS, INFANTILE.—(*See* Infantile Paralysis.)

PARANOIA.—(*See* Mental Diseases.)

PARATYPHOID FEVER. There are two varieties of this disease, one due to the *Bacillus paratyphosus A*, the other to the *Bacillus paratyphosus B*. Before the great war the former was met with in Asia, especially India, and not in Europe; the latter, on the other hand, occurred in Europe and was rare in Asia, and even in Europe was not common compared with typhoid. When, however, the epidemics of "enteric" fever broke out in 1915 amongst the armies in Belgium and France and the Near East, not only did cases of paratyphoid appear in larger numbers than before, but paratyphoid A was met with as frequently as paratyphoid B.

The fatality of paratyphoid A for all ages before the war was estimated by Bainbridge (1912) to be about 2 per cent, and that of paratyphoid B about 3 per cent. Speaking generally, amongst the military cases the fatality of paratyphoid (A and B together) has been about 3 per cent, certainly not higher than 4 per cent, but it has varied in different groups of cases from below 1 to over 11 per cent. Still, even the highest rate is much lower than that of typhoid amongst males of military age (about 22 per cent), so there can be no question that at the worst paratyphoid is a much less severe disease than typhoid.

There is a difference of experience concerning the relative fatality of the two forms of paratyphoid in the military cases: the English observers appear to have found paratyphoid A, the French paratyphoid B, the more severe.

Death is usually due to some complication, and complications are, on the whole, not so frequent as in typhoid. Haemorrhage, rarely severe, occurs in not more than 5 per cent of the cases of both varieties; perforation in less than 1 per cent, nephritis in 4 per cent, rheumatism in 5 per cent, and phlebitis in 4 to 5 per cent. Pulmonary complications are not very infrequent, and boils and abscesses are common. Relapses take place fairly often—in 7 to 10 per cent.

In paratyphoid the febrile stage may be of several weeks' duration, and, as in typhoid, recovery is slow. It has not been shown that serum treatment makes the prognosis more favourable.

It must be remembered that the statistics from which these figures have been taken relate to military cases occurring during the war, and that other factors connected with the conditions of military service may well have had an influence on the character of these diseases.

Paratyphoid can only very rarely be distinguished from typhoid fever, except by bacteriological examination of the blood, stools, and urine, or by careful agglutination tests. *E. W. Goodall.*

PELIOSIS RHEUMATICA. (*See* PURPURA.)

PELLAGRA. Pellagra varies greatly in its type, the prognosis being grave in acute cases, but fair in the more chronic form. According to Lombroso, the mortality among 13,000 cases in Italian hospitals in 1883–4 was 13 per cent, but in 1895 among 55,029 cases collected by Wollenburg it was but 4 per cent, while Sandwith recorded

a similar figure in non-insane pellagrins in Egypt. In America the disease is more severe, the death-rate having been about 15 per cent among 636 insane pellagrins, although according to Bass it is becoming milder in New Orleans. Roberts gives the mortality in the United States as 50 per cent in asylums and about 25 per cent in general practice, but thinks it will become less in time.

In individual cases, bad indications are acute dermatitis with vesicles, a pulse over 120 while in bed, a temperature over 100 especially with delirium, continued diarrhœa with rapid loss of flesh, and prostration. Steady gain in weight is the most favourable sign, although it is impossible to say in a given case whether a relapse will occur in the ensuing spring. Recent work in America indicating that the disease is due to the deficiency of certain elements in the diet called vitamines, by supplying which it can be cured, will, if confirmed, materially improve the prognosis. Transfusions of blood have also been reported as having proved curative in America.

Leonard R[illegible]

PEMPHIGUS AND PEMPHIGOID AFFECTIONS.—It is important to make clear exactly what diseases are included under the term pemphigus before endeavouring to estimate prognosis. The description 'pemphigus' has been applied to many eruptions characterized by the formation of bullæ or blisters, but the use of the word is now more limited. Recently the convenient term 'pemphigoid' has been coined to cover certain allied conditions which will be considered here.

Pemphigus Neonatorum is a bullous variety of impetigo occurring in newly-born infants. The eruption is chiefly on the trunk, and is often associated with a septic condition of the umbilicus. The mortality is about 30 per cent. The cause of death is generally septicæmia or pyæmia, the infection becoming generalized through the umbilical stump. Provided the lesions are confined to the skin, and that they are properly dressed with antiseptic ointments, the outlook is not unfavourable.

Pemphigus Contagiosus is the name given to a bullous impetigo which is most commonly seen in the tropics, but is occasionally met with in this country. The eruption consists of large blebs filled with a serous fluid at first, but subsequently the contents may become purulent. To this eruption the name pemphigus is often given, and many of the so-called mild cases of the disease are of this type. The eruption usually yields rapidly to antiseptic treatment.

Epidermolysis Bullosa (so-called **Hereditary Traumatic Pemphigus**) is a rare affection, characterized by the formation of blebs containing serum or blood, caused by slight friction or pressure which, in the normal subject, would be unattended with any reaction whatever. It varies very much in its severity, and various degrees are often seen in several members of the same family and through several generations. If severe, it may incapacitate the sufferer from doing ordinary labour throughout life. In the less severe cases it is a constant source

of annoyance and a hindrance to work. Moreover, the abraded surfaces are liable to infection. Though the disease must be looked upon as incurable, there are cases in which the development of the blebs becomes less marked with the approach of puberty.

Dermatitis Herpetiformis.—This affection is one of the most troublesome in the domain of dermatology. It is characterized by the development of a polymorphic eruption, consisting of erythematous areas with groups of herpetiform vesicles or bullæ of variable size. The eruption is attended with great irritation, and sometimes with pain. It tends to develop in early life, and may persist for many years. The attacks occur at intervals, and vary greatly in their severity. In some cases the periods of intermission are very short, so that the sufferer is rarely free from the eruption; in others, there are long intervals between the attacks. An attack can usually be controlled by arsenic, pushed to the capacity of the patient, and by ointments containing sulphur. In some instances the patient is able to carry on his avocations owing to the limited area affected; in others an almost complete incapacity is produced. We are ignorant of the cause of the affection, and are, therefore, unable to do more than temporarily relieve the condition.

Hydroa Gravidarum or **Hydron Gestationis** is dermatitis herpetiformis occurring in pregnant women. It commonly appears between the third and sixth month, and often recurs with successive pregnancies; as a rule, the severity of the disease increases with each succeeding attack. In many cases the eruption clears up soon after the delivery of the child; but in some instances the disease may start after parturition. It is rare to find the condition so severe as to determine the pregnancy, and recovery is the rule.

Pemphigus Acutus.—This is a rare affection occurring in butchers and others who handle dead carcases. It is believed to be due to a diplococcus, which has been isolated by Bulloch and others. The prognosis is extremely grave. The symptoms are those of a grave septicæmia, and death occurs in 75 per cent of the cases, in from one to three weeks after the onset of the disease. In the minority of the cases, convalescence begins in from three to four weeks.

Pemphigus Chronicus.—This disease, which is somewhat rare, is of grave prognosis. Of 30 cases admitted with this diagnosis into the wards of the London Hospital, 19 died, but this does not represent the entire mortality, because several cases running a very chronic course were removed to the infirmary and died there. It is exceedingly difficult to state at the onset what course the affection is likely to run, for many cases begin with a limited eruption, which gradually extends in spite of treatment. As a rule, the younger subjects are most likely to recover. The fatal issue usually occurs in from three to eighteen months, but in some cases a longer course is seen, the disease passing on to pemphigus foliaceus.

Pemphigus Foliaceus.—This variety of pemphigus is characterized by the formation of flaccid bullæ, followed by a condition of general

exfoliation of the skin. It may be primary, or the sequel of the chronic form of pemphigus, or rarely of dermatitis herpetiformis.

The course is chronic, and the affection may persist, with exacerbations and remissions, for two or three years or longer. A fatal issue is brought about by gradual asthenia, diarrhœa, or some intercurrent disease.

Pemphigus Vegetans.—This is an exceedingly rare disease, characterized by the formation of bullæ on the base of which vegetations rapidly develop. The fatal issue usually occurs in from two to six months. Though nearly always fatal, a few cases occur in which the eruption is limited to the limbs and trunk, and runs a benign course.

J. H. Sequeira.

PENIS, CARCINOMA OF. Prognosis always depends upon accurate diagnosis, and therefore it will be necessary, before giving an opinion as to the outlook, to make certain that the condition is not a tertiary syphilitic ulcer, primary chancre, or mass of hard warts, all of which are, of course, curable conditions.

Epithelioma of the penis is not a particularly malignant variety of cancer. Apart from operation, it always leads to a fatal termination, usually in two or three years, but cases lasting five or even ten years are on record. The cauliflower type of growth is not so rapid as the deeply ulcerating.

Various methods of operative treatment are in use, such as: Amputation of the penis; extirpation of the penis (Pearce Gould's method); one of the above with bilateral removal of inguinal glands, either at the same time or subsequently.

Mere amputation of the penis, except in a broken-down subject, is a trifling operation. At St. Bartholomew's Hospital, prior to 1900, there was 1 death in 53 cases. The mortality of Gould's operation at that time was said to be 6 per cent. Clearance of the groin glands would, no doubt, add to the risk to some extent, but the immediate danger to life depends far more on the general health of the individual than on the exact nature of the operation.

The end-results were worked out by Butlin[1] in a series of 65 cases treated, prior to 1900, by simple amputation of the penis, usually without clearance of the inguinal glands. Of 65 cases followed three years, 23 were still free from recurrence, or 35 per cent. There were no difficulties with micturition, and coitus was still possible for some of them. The principal factors in prognosis are the rate of growth up to the time seen and, especially, whether the groin glands are palpably enlarged: if they are, the outlook is much more serious than in cases where they cannot be felt.

Of 9 recurrent cases, in 3 the growth returned in the penis, and in 6 in the groin glands only. This is, of course, a strong argument for clearance of the inguinal region. It also demonstrates that total extirpation of the penis by Gould's method need only be adopted for extensive growths, because there is no great tendency to spread back in the corpora cavernosa. It would no doubt be wise, and it is quite

possible, to remove the lymphatics of the deep fascial plane in a continuous sheet, from the growth to the inguinal glands, by a dorsal incision along the penis.

Even if the patient is not permanently cured, amputation of the penis is nearly always a great relief to him.

A study of 100 cases operated on between 1872 and 1905 at the Massachusetts General Hospital has been published by Barney. He points out that recurrence after operation may be quite late: 39 per cent of the relapses are in the first year, but 12 per cent are over five years. Pearce Gould's operation gives no better results than simple amputation. Only one patient out of the 100 died in hospital. Very few patients (2) were cured when the groin glands already showed cancer microscopically.

End-results were known in 90 cases. Of these, 27 were 'cured' (that is, alive and well for many years after—or else died of old age over five years later) and 15 more died, not of cancer, within five years. One of these died in hospital of sepsis. One patient refused operation and was alive eleven years after. Twenty-two died of cancer without another operation, the average period being twenty-four months after removal of the growth. Twenty-six recurred, and 24 of them had a further operation, out of which 11 were 'cured' (alive and well, average period twenty-four years after), 4 died of other causes, and 10 died of cancer, the average time from first onset to death being over eight years. Nearly all the recurrences were local, not in the groin glands.

RESULTS OF OPERATION FOR CARCINOMA OF PENIS.

Butlin	65	23			
Barney	90	27	15	33	15*

We may, therefore, conclude, on the whole, that the mortality of operation is about 1 per cent, and that nearly half the patients have been cured even by the inadequate methods of many years ago. A second operation for recurrence seems to save another third. Probably quite two-thirds would be saved by present-day surgery.

REFERENCES.—[1]Butlin, *Operative Surgery of Malignant Disease*, 2nd ed. [2]Barney, *Ann. Surg.* 1907, xlvi, 890.

F. Rendle Short.

PERICARDITIS. (*See also* RHEUMATIC PERI-, MYO- AND ENDOCARDITIS.) Nowhere is a knowledge of etiology and pathology more essential to clinical accuracy than in pericarditis. It is quite futile to attempt a forecast of the probabilities in a case of pericarditis without

[illegible]ing how it began. There are two reasons for this. First, the lesions underlying or associated with pericardial inflammation may have far more bearing on the course of the case than the pericarditis itself. Second, inflammation of the pericardium runs a very different course according to the cause.

The commonest of all the forms of pericardial inflammation is that which is associated with *rheumatic carditis*. As this is discussed under a separate heading, no more need be said here than will serve to bring it into line with the other types. First, it is scarcely accurate to speak of rheumatic pericarditis as if it were of itself a disease. It is never more than one feature of that which includes it—namely, rheumatic pancarditis.

When the rheumatic infection attacks the heart, the muscle and the mitral valve are always injured, the pericardium nearly always, and the other valves sometimes. When the pericardial inflammation is sufficiently intense, it gives rise to an audible rub. This is so striking a feature of the case that it is labelled 'pericarditis,' and the fundamental fact that the whole heart, and not the pericardium only, is damaged, is lost sight of. Second, the fact that there are signs of pericarditis is nevertheless of considerable prognostic importance, for it is a proof that the dose of infective agent that has been cast into the heart by its coronary blood-supply is a large one. The mortality of cases in which a rub is heard is much higher than in cases of rheumatic carditis without friction (20 per cent. as compared with a mortality certainly under 10 per cent even if only severe cases be included). Third, the permanent disabling of the heart is greater in cases of rheumatic carditis with implication of the pericardium than it is in those that show no signs of pericarditis, for a certain amount of adhesion is an inevitable result of rheumatic pericarditis. The extent to which these adhesions inflict real disability on the heart is doubtful; some allusion to this matter will be made below. Finally (and this also will be discussed below), effusion into the pericardial sac is a very rare complication of rheumatic carditis. Most of the cases in which this used to be diagnosed were in reality cases of acute dilatation due to myocarditis. The whole import of rheumatic pericarditis, therefore, is that it is a sign that the attack of carditis of which it is one feature is a severe one. In general, the more definite and intense the signs of pericarditis, the worse is the outlook; but the state of the myocardium is far more important than that of the pericardium, and it is in this direction that one should look for guidance in prognosis.

A second type of pericarditis is that provoked by the *pneumococcus*. This may occur as a complication of lobar pneumonia in adults, or on small foci in connection with empyema. In the latter group it is difficult to detect and equally difficult to treat; the results are therefore very bad. The examples of accurate diagnosis and early operation are very few, whereas suppurative pericarditis is a fairly common complication of pneumococcal empyema in infants and young children.

Of the 102 cases complicating lobar pneumonia collected by various writers, 70 or 68 per cent. ended fatally. This of course excludes cases in which the diagnosis was only made post mortem. In both types of case it is possible that operation facilitated by early diagnosis might not have saved many lives. For when pericarditis occurs in adult children, the patient is nearly always very ill as a result of an empyema, of which the pericardial lesion is only a complication; and the adults who show signs of pericarditis with their pneumonia are often of the type that resists the original disease badly. Moreover the pneumococcal effusions are seldom large, so that even if operation were more often possible it might not add a great deal to the patient's chance of recovery. Still the fact remains that if there is an effusion of any bulk, nothing but operation can save the patient's life. The mode of operation will be considered below.

Cases of *tuberculous pericarditis* do better so far as the immediate results of operative procedure are concerned. It is true that of 42 cases so treated only 11 are regarded by those who report them as being cured; but this is because in many instances temporary amelioration was followed by aggravation of the lesions in other organs. Tuberculosis of the pericardium is nearly always part of a more general infection, and it is on this fact that the prognosis largely turns. There are two kinds of cases, the chronic adhesive and the acute exudative. The former concomitates the more chronic form of pulmonary tuberculosis, the latter arises as the result of generalized infection. The patient's chances of survival turn in part only on the course of his pericardial infection, if there be tuberculosis of other tissues. But as it is rarely one event in a generalized miliary tuberculosis, it is obvious that the only prognostic importance of signs of tuberculosis of the pericardium is that they reveal something of the intensity of the infection, and by that much add to the gravity of the prospect.

Much the same is true of the pericarditis which may complicate the various forms of *septicæmia and pyæmia*. In many cases, no doubt, it is only at the post mortem that these lesions are found. This fact was borne in upon the writer some years ago, in the course of an investigation into the **cardiac lesions of pyæmia.** The number of cases of pyæmia recorded in the autopsy books of the old pre-antiseptic days of surgery was in itself a revelation, and in a very large percentage of these the pericardium contained pus. **Nowadays** this form of pericarditis is happily less frequent, but we encounter it sometimes as a feature of puerperal septicæmia, acute osteomyelitis, and the like. When it occurs under these circumstances, pericarditis is of necessity a grave factor in an already unpromising situation, since it furnishes evidence that the circulating blood is saturated with microorganisms. **But this** does not carry with it an immediate sentence of death, for the literature contains several instances of recovery after medical treatment of purulent foci due to this type of infection. It is true that in most of these cases death has not been long delayed, some other lesion of a vital organ arising from the same infective

process, kills the patient, even though the pericardium has been successfully drained.

Pericarditis is an occasional complication of *typhoid fever*. It is not invariably fatal; two of the three cases observed by Thayer recovered.

The same is true of pericardial lesions provoked by [illegible] infection; in the case recorded by Rohn and Fiessinger recovery followed paracentesis.

In the pericarditis of *scarlet fever* the prognosis depends on the nature of the organism provoking it. If the pericardial inflammation be but one incident in the course of a severe septic scarlatina, its importance is that it adds to the gravity of the prognosis. If it arises during or after convalescence, it is most probably rheumatic, and the prognosis is that of acute rheumatic carditis.

Four other forms of pericarditis remain to be considered. The so-called *terminal* cases, due to streptococcal and staphylococcal infection, and complicating chronic diseases, especially renal disease, are not always fatal. It is impossible to set this statement on a statistical basis, because there are two facts which vitiate any calculations—the difficulty of discerning between true pericarditis and mere hydropericardium, and the very small percentage of pericardial lesions of this type which are diagnosed during life. In general it may be said that the appearance of pericarditis in any chronic disease such as diabetes, Bright's disease, or cancer, adds substantially to the immediate risks, the chance of survival depending almost entirely on the general condition of the patient at the onset of the pericarditis.

In *traumatic pericarditis* the outlook naturally depends on a variety of factors, apart from the state of the pericardium itself. Limiting our consideration to the pericardial lesions as far as possible, we find that, if all cases be included, the mortality is about 40 per cent. If only those cases be counted in which the injury has failed to penetrate the chest wall, it seems that about three-quarters get well. In the open cases the occurrence of air in the pericardium is not necessarily fatal.

When the pericardium becomes implicated in *malignant disease* arising within the thorax, signs of pericarditis may become manifest. In such, a promise of immediacy is added to an already fatal prognosis. This is particularly true of perforation of the cancerous œsophagus into the pericardial cavity.

Last of all, there is the pericardial rub which, appearing suddenly in a case of *chronic myocardial disease*, furnishes proof of some gross lesion of the cardiac wall—thrombosis, embolism, or rupture. This is always a sign of the utmost gravity, for even if the patient be not immediately destroyed, his survival cannot be more than brief.

But it is not only as a revelation of sinister forces that pericarditis carries a threat of death. The rapid collection of fluid within the pericardial sac may kill the patient. There is also the formation of adhesions, and their influence on the cardiac efficiency, to be thought of. Acute serofibrinous pericarditis cannot of itself kill the patient;

that it does on the one hand prove the existence of certain collateral dangers, such as rheumatic myocarditis; while on the other hand it threatens more or less directly to hamper and possibly overcome the heart by leading to pericardial effusion or adhesion.

Effusion into the pericardium, in amounts sufficient to endanger the life of the patient, is a very rare result of rheumatic infection. Some eminent observers declare that it never amounts to enough to call for paracentesis. There are, however, a number of cases of the kind in which it has been thought necessary to puncture the sac. In these the results were roughly as follows: the course of the case was not materially altered in about 50 per cent; in 25 per cent there was some transient improvement; while in the remaining 25 per cent paracentesis appeared to give material and lasting relief from a condition of urgent peril. The writer has never seen a case of rheumatic pericarditis in which the operation would have been justified, either by the signs during life or by the post-mortem findings. In the series of cases of effusion into the pericardium brought forward at the Royal Society of Medicine discussion in 1910, there were only 9 rheumatic cases in which it had been thought advisable to empty the sac, and in only 3 of these was life prolonged by the proceeding. Clear effusions are perhaps more characteristic of tuberculosis than of any other infective process, but they are often semi-purulent in this disease. As has been already remarked, the immediate outlook in those cases of tuberculous effusion that are diagnosed during life (about 6 per cent of all cases) is fairly good; the choice between paracentesis and pericardiotomy seems to depend on the character of the fluid, the former procedure sufficing for the clear cases, while the more elaborate operation is called for if the exudate be puriform. At any rate, the results in the published cases, in which this rule seems to have been roughly followed, work out about equal. It should be added that if the exudate be hæmorrhagic, this is no contra-indication to paracentesis, as cure has followed the operation in several such cases. This is true of pericarditis due to other infections beside tuberculosis. The dangers of simple hydropericardium are as a rule overshadowed by the more direct risks implied by the underlying lesions, and the outlook is therefore that of the cause.

Pyopericardium is a desperately dangerous disease, whatever the infection that is responsible for it. The risks are, first, those due to such other lesions as the causal infection may have provoked; second, those that arise from the fact that purulent pericarditis is very difficult to detect (in only 6 of Poynton's 100 cases in children was it diagnosed during life); third, those that are due to the risks of surgical treatment, the only form of treatment that can hold out any hope of cure; and finally, those that are included within the possibility of increase of the effusion to the point at which the cardiac movements become fatally hampered.

Suppose the condition has been detected in a patient who is fit to be operated on: what plan of treatment promises the best results? The

figures published by various writers, and tabulated in Blechmann's excellent monograph, show that mere paracentesis has never saved life; that the percentage of survivals after incision of the pericardial sac is about 46 in a total of nearly 400 recorded cases; that the recovery rate following simple incision is 28 per cent; after pericardiotomy with costal resection, 55 per cent; after operation through the epigastric incision recommended by Ogle, 66 per cent. These figures demonstrate clearly the superiority of the methods in which free drainage is secured. Such figures as are available are not very convincing as to the advisability or otherwise of drainage in pericardial tuberculosis; but the general opinion of surgeons and physicians expressed at recent discussions, is to the effect that if incision be practised at all, it should be sewn up and not left to drain.

In *pneumopericardium* the outlook is of necessity dependent to a large extent on the antecedent conditions; and as it often forms a late incident in a morbid process that would be sufficiently desperate even if there were no irruption into the pericardium, it is not to be wondered at that the death-rate is high—28 out of 43 cases (Cowan, Harrington, and Riddell). The more abrupt the invasion of the pericardial sac, the worse the prognosis.

There remains to be considered the vexed question of *chronic adhesive pericarditis*. This is met with under several sets of circumstances. In the cardiac rheumatism of childhood, some adhesion is very common (in three-quarters of Poynton's autopsy cases, and nearly half of the writer's). In the various forms of chronic indurative mediastino-pericarditis the sac is more or less obliterated. A third group of cases is that embraced within the term 'polyserositis.' These may be due to tuberculosis or to no obvious cause.

It would at first sight appear to be a simple matter to accept the position that adherent pericardium is always a serious condition; but there are two considerations that complicate the issue. In the first place, all the diseases named inflict other disabilities on the heart or other vital organs, and it is difficult to separate these from the direct effects of pericardial adhesion. In the second place, the fact that the pericardium is adherent is by no means always discoverable clinically. The rheumatic type of case is by far the commonest, and here there is, in the writer's opinion, no reliable sign of pericardial adhesion. Of all the phenomena that have been described as pointing in this direction, there is not one that may not be present in the absence of adhesion; and it would seem that all of them are due rather to the great cardiac enlargement that is so constant a feature of just those cases in which post-rheumatic adhesion of the pericardial sac is likely to occur—in the adolescent or young adult who has just managed to survive repeated attacks of acute rheumatic carditis, though with a heart much enlarged and otherwise crippled. Be this as it may, the fact no doubt remains that in those cases of post-rheumatic disease in which there are adhesions not only obliterating the pericardial sac but also binding the epicardium to the neighbouring tissues, the heart

[illegible] on its work far less efficiently than in cases where there are [illegible] valvular disabilities to be overcome. If, therefore, the clinician finds himself in a position to diagnose this condition in a case of post-rheumatic heart-disease, the prognosis he must form will be much graver; patients in this class of case rarely attain the age of thirty. In the non-rheumatic type of case the prognosis is to be reached along the same lines; if there be signs of adhesion uniting both pericardial [illegible] into one membrane, and that again into inseparable fusion with the surrounding tissues (and nobody claims to be able to diagnose extra-pericardial adhesions), then the prospect of cardiac failure [illegible] a few years at the outside, is added to such other portents as [illegible] disease in its attack on other organs may furnish.

The main interest of the question as to the influence of treatment on prognosis centres around the effect on the patient's outlook of the operation described by some as cardiolysis, but more accurately by [illegible] as thoracostomy. Of 30 cases of which the writer has been able to collect the reports, only 1 died as the immediate result of the operation; of the remainder, 7 are described as receiving little or no benefit, while in the remaining 22, various degrees of improvement were observed. In reading these records, one is struck by the fact that the disappointments occurred principally in the rheumatic cases. Such operations of this kind are not likely to be practised in the future in such cases, except perhaps as giving space to an enlarged heart. The cases most likely to benefit from this operation belong to the [illegible] group.

Carey F. Coombs.

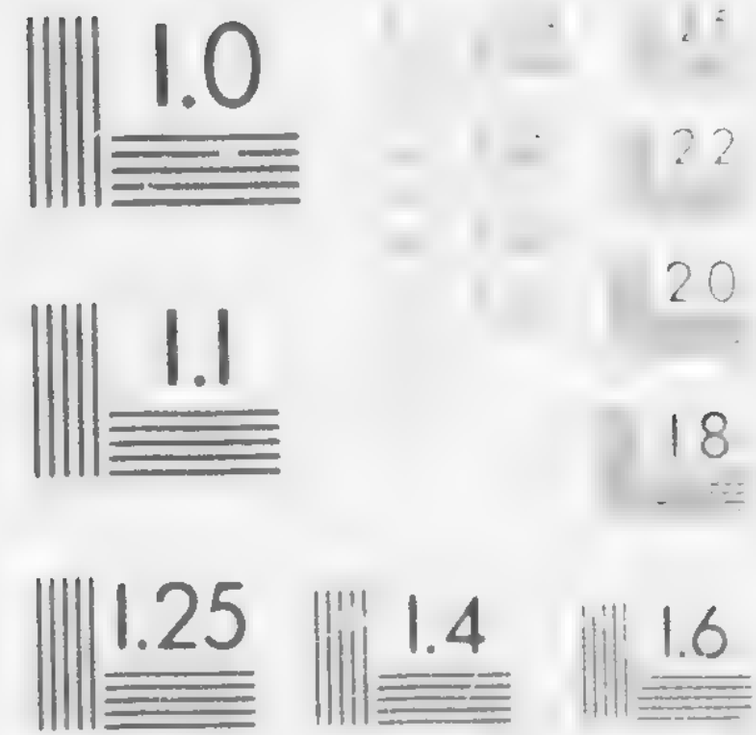
PERITONITIS, PNEUMOCOCCIC.—There are two very definite types of this rather uncommon disease, the prognosis in the one being [illegible] grave, and in the other remarkably favourable. These are: (1) *The diffuse or acute type*, and (2) *The encysted or chronic*. Either [illegible] may or may not have been preceded by an attack of pneumonia. The diagnosis can only be regarded as certain when the pneumococcus is found either at operation or autopsy, or, in a few cases, when the pus leaks away at the umbilicus.

1. **Acute Diffuse Pneumococcic Peritonitis.** Of the 91 cases in the literature reported by Annand and Bowen, 46 belonged to this group. Of 17 cases at the Bristol Royal Infirmary and General Hospital, 12 were acute.

The patients are almost all little girls. They present the clinical [illegible] of an acute general peritonitis of rapid onset, often accompanied by a marked tendency to diarrhœa. In about half the cases there is evidence of pneumonia beginning a day or two previously. The diagnosis of appendicitis with general peritonitis is usually made, as there is no special localization of pain or tenderness in the right iliac fossa.

The prognosis is very grave indeed. Ruehbieth quotes 45 cases, [illegible] which died. Of the Bristol cases, 11 out of 12 died. Of 6 cases at St. Bartholomew's Hospital, all died. In Annand and Bowen's

MICROCOPY RESOLUTION TEST CHART



series 6 recovered and 10 died. All the Bristol cases except 2 (both fatal) were operated on. In Annand and Bowen's list 18 were operated on and 6 recovered. Curation in a series of 20 cases from Guy's Hospital shows 12 operated on and all alive, 2 recovered. 8 others died without operation. The three recoveries each had a second operation to evacuate a residual abscess. The prognosis is not greatly affected by the question as to whether there has been a previous pneumonia or not. If death occurs, it is usually within a few days.

In practice it is not for us to do the air bacillus a prognosis because of the uncertainty of the diagnosis before operation. But when there is localized tenderness of the abdomen with marked rigidity, pain, fever, and diarrhœa, the only diseases reasonably probable are a little old and perforated appendicitis and this disease, and in both the outlook is very grave with immediate operation, and almost hopeless without. One should make certain that there is not a pneumococcal valve vaginitis present, because pneumococcal peritonitis is decidedly more favourable.

PNEUMOCOCCIC PERITONITIS.

Early diffuse form	Annand and Bowen operated	18	6	33.3	12	66.6
	not operated	28	0	0	28	100
	Bristol	12	1	8.33	11	91.66
	St. Bartholomew's Hosp.	6	0	0	6	100
	Rieddorff	45	0	0	45	100
	Curation	12	3	25	9	75
Illness	St. Thomas's Hosp. 1907–11	16	9	56.29	7	43.8
	Cornelissen	20	13	65	7	35
Chronic encysted form	Annand and Bowen	43	37	86	6	14
	Bristol	5	4	80	1	20

2. **Chronic Encysted Pneumococcic Peritonitis.** In this very interesting and remarkable disease one is confronted with the strange sight of a large cavity in the abdomen containing, it may be, pints of pus, surrounded by intestines, liver, and stomach all matted together, and yet the patient is superficially little affected. In one of four cases seen by the writer the abscess quietly burst at the umbilicus before the girl was sent to hospital; in two others (sisters) the temperature was but little raised, and the patient did not look ill. They came under observation about a week after the onset of the abdominal pain and swelling, and both had had pneumonia. The pus has not an offensive odour, and is thick and creamy.

The great majority of the cases are operated on and recover. In Annand and Bowen's series of 45 the result was known in 43, and of these 37 recovered. Only one of these was not operated on; in this patient the pus burst to the at the umbilicus, and recovery took place. Four out of five Bristol cases of this encysted variety recovered; one

of them has subsequently developed abdominal pain, [illegible] due to adhesions.

Probably the majority of the cases of pneumococcic peritonitis at St. Thomas's Hospital, 1907–1911, were of this type, inasmuch as 9 out of 16 were cured. The same applies to the Edinburgh [illegible] Hospital series described by Carmichael.

References. Annand and Bowen, *Lancet*, 1906, i. 1591; [illegible] *Quart. Jour. Med.* 1911; Noon and Moreton, *St. Bart.'s Hosp. Rep.* 1912, [illegible]; *St. Thomas's Hosp. Rep.* 1907–11.

A. Rendle Short.

PERITONITIS, SEPTIC. The prognosis of local and diffuse peritonitis is considered under its causative headings (*see* Appendicitis; Stomach, Surgical Diseases of (Gastric Ulcer, Perforated); Peritonitis, Pneumococcic; Peritonitis, Tuberculous); but there are some general considerations which may be found useful.

It is well known that the prognosis of peritonitis in the lower abdomen (e.g., of pelvic origin) is much more favourable than when the upper abdomen is involved.

A very important prognostic factor is the degree of intestinal paralysis. Incessant vomiting is grave; on the other hand, if the bowels are opened, the outlook is immensely improved. These are the most important symptoms in judging of the patient's chances. There is a type of case (one variety of which Mr. Sampson Handley has described under the name of *ileus duplex*) often following operation, in which, after a local peritonitis, usually pelvic or appendicular, the coils of small intestine, and sometimes colon also, become matted in the pelvis, producing what is virtually an intestinal obstruction, partial at first and becoming absolute in the course of a few days, with immense distention of the abdomen. The outlook is always grave unless there is a definite residual abscess which can be evacuated. If an enema, physostigmine, and enemata do not soon relieve, the patient's best chance will be to have another operation, which may be a [illegible] circumcising, a temporary colostomy, or merely a freeing of the coils of small gut. About half the cases can be saved by one of these measures.

Assistance may be given in the prognosis of an acute peritonitis by a bacteriological and cytological examination of the exudate. A *Streptococcus aureus* infection is very favourable; *B. coli* and *Staphylococcus aureus* give average results; *Streptococcus* and *B. pyocyaneus* are nearly always fatal (Dudgeon and Sargent). [illegible] and therefore of more clinical value is a cytological examination. Some surgeons use this to help them to decide whether to close the abdomen or to drain. The normal sequence is that bacteria are extravasated and multiply; at first in the free state; then leucocytes appear on the scene and ingest the bacteria [illegible] and thirdly, macrophages are found to effect processes of repair. The presence of many free germs, therefore, a scanty [illegible] of leucocytes, and no macrophages, is always a grave sign; if macrophages are present and all the germs are intracellular, the patient will recover.

A. Rendle Short.

PERITONITIS, TUBERCULOUS.—It is very difficult to appraise correctly the relative value of medical and surgical treatment in this disease.

Results of Medical Treatment. We will first collect the evidence as to the outlook when cases are treated by medical means only. There is no lack of statistics of a sort, but many of them are vitiated by ill-arrangement, inadequate details, or too early reporting. Thus Faludi, by adding up a mass of German reports, quotes 156 cases treated without operation, of which about a third got well; but we do not know for how long a time they were watched. The writer has obtained details of 14 cases treated in various institutions in Bristol by fresh air, iodoform, mercurial ointment, cod-liver oil, etc. All of these were followed for at least two years, and most of them for four years or more. Of the 14, 10 were cured, 1 relapsed, and 3 died; one of these last three had an immediate operation just at the end, when death was already imminent. Oehsner, by the analysis of a mass of figures, concludes that half of the cases treated medically get well; but that half of these relapse later, so that only a quarter are finally cured. Borchgrevink followed up 17 cases treated medically; 3 of these died, and 14 were well for two years or more.

It is quite useless to set these figures up as an alternative to those obtained by surgical intervention; for the great majority of the patients treated medically are handed over to a surgeon as soon as it becomes evident that they are not doing well; and it is quite certain, therefore, that the Bristol cases and Borchgrevink's, for instance, are much too favourable, representing, as they do, only those patients who are not bad enough to be operated on.

In an orphan asylum in Bristol, where the physician preferred to treat all cases medically, 6 were cured and 3 died; they were all well cared for from the first, and obtained plenty of fresh air, good food and skilled nursing; so that these results are probably too favourable. In dealing with this disease, the worst statistical reports are more likely to be correct than the best. It is probably fair to accept Faludi's view, that about one-third will recover, and two-thirds will eventually die, apart from surgical intervention. The illness is likely to be prolonged; it is generally a year or two before they can return to normal life.

Results of Operation.—These are much easier to obtain with some degree of reliability, though here also there is a tendency to report too soon. Most of the figures are taken from hospital records, and may therefore be trusted. In Caird's and Borchgrevink's and in the Bristol series, the patients were followed for more than two years; in Czerny's, the majority were followed over three years, but others for a lesser period; Oehsner's and Bottomley's were traced for one year only.

It will be observed that the immediate mortality varies a good deal; the Bristol cases included two deaths from intestinal obstruction, one from ileosigmoidostomy, and one from perforative peritonitis.

and are therefore too high. The true mortality of the operation, in properly selected cases, is not more than 1 or 2 per cent.

With the exception of Oehsner's series, which is reported too soon the end-results are much the same everywhere; it will be seen that rather more than half are well for two years or more; 40 per cent. approximately, die of some form of tuberculosis; and a certain small number relapse, or are little improved. This agrees with the conclusions of Fenger, but is less favourable than those of Faludi, who claims that of 125 operation cases, 70 per cent were 'cured': but we do not know for how long.

RESULTS OF OPERATION FOR TUBERCULOUS PERITONITIS.

Eliasberg			24	11	2	11
Borchgrevink -	—	—	22	13	0	9
Czerny -	41	3	38	18	9	11
Oehsner - -	32	1	20	15	0	5
Matteson - -	53	0	37	17	0	20
Card - -	31	3	17	8	0	9
Bristol hospitals	33	7*	20	11	2	7
Total -	190	14	178	93	13	72

The Mayos claim excellent results by removing tuberculous tubes in adult females.

We may sum up, therefore, by saying that, on an average, about a third of the patients will be cured by medical means; and of those that come to operation, about half will be permanently freed from their trouble. Inasmuch, however, as the first of these figures is little more than a guess, the value of operation is not very securely established.

Prognosis in Individual Cases.—There does not appear to be much difference between the results in adults and children. Febrile cases are said to do better than afebrile (Borchgrevink). The more acute the onset, the worse the prognosis (Rolleston).

The type of the disease is of very great importance in this respect. *The ascitic type*, with abundant free fluid, but no adhesions, does best. *The ulcerous type*, with great wasting, a huge abdomen, irregular temperature, and tendency to diarrhœa, only recovers in quite exceptional cases. A fæcal fistula is practically a death-warrant. *The mixed or adhesive type* is intermediate. Most of the operation figures refer to the ascitic type.

Bottomley and Matteson both distinguish between the results of operation on the different kinds, as shown in the following table:

MORTALITY ACCORDING TO TYPE OF PERITONITIS.

Bottomley	-	-	16	7	7	3
Matteson	-	-	29	10	24	18

Grave signs, in any particular case, are marked wasting in spite of treatment, uncontrollable diarrhœa, and evidence of pulmonary tuberculosis.

In fatal cases, death usually takes place in six months to two years; those surviving the latter period are likely to recover. It is remarkable how it occasionally happens that even a badly matted abdomen may eventually get well.

Death results from intestinal obstruction, perforative peritonitis, exhaustion from diarrhœa, fæcal fistula, and generalized tuberculosis.

REFERENCES.—Fenger, *Ann. Surg.* 1901, xxxiv, 771; Bottomley, *Boston City Hosp. Med. and Surg. Rep.* 1900, 118; Ochsner, *Trans. Amer. Assoc. Surg.* 1902, 191; Matteson, *Providence Med. Jour.* 1911, 6; Caird, *Edin. Med. Jour.* 1912, viii, 295; Discussion, B.M.A. *Brit. Med. Jour.* 1911, ii, 473.

J. *Rendle Short.*

PERNICIOUS ANÆMIA. There are few conditions in which the practitioner of medicine finds more scope for the exercise of his prognostic powers than in pernicious anæmia. Death may occur within a fortnight after the patient comes under observation, and, on the other hand, a fatal issue may be delayed for twenty years; but in spite of this very wide range of possibilities, the skilled observer may be able to assign nearly every case to a place in the acute, the subacute, or the chronic group, the characters and course of which are fairly definite. Even after cases have been assigned to their appropriate class, a careful review of general symptoms, together with a thorough examination of the blood, will enable the practitioner to make further refinements, and he can often predict the course of the individual case with very considerable accuracy. One of the remarkable features of the disease is the occurrence of remissions. They sometimes begin quite abruptly, even although severe symptoms may be present, and their occurrence is often attributed to the exhibition of medicines which had no part in bringing about the improvement.

Remissions may last for months or even years. A patient may undergo as many as half a dozen remissions and relapses. During the remissions, the chief abnormal characteristics of the blood may disappear; but in many cases a rather high colour-index, or some other special feature, may persist; the remission may be complete as regards disappearance of symptoms. This is particularly likely in

the case of remission following a first attack; after subsequent attacks, remissions are less likely to be complete, and the patient is most likely to remain, at the best, in a condition approaching or exemplifying semi-invalidism.

History.—It is of prime importance to take into account the cause of the disease. If the cause can be discovered and removed, the outlook is good. If not, the disease will sooner or later prove fatal.

The cases due to *Bothriocephalus latus* can practically all be cured.

Cases which begin during pregnancy and the puerperium are likely to recover if the very dangerous period during which the symptoms are acute can be safely tided over. Some cases appear to be due to cancer of the stomach. Little hope can be held out in these, as there is no likelihood of a remission, and without a remission of the anæmia, operation would be out of the question. When no cause can be discovered, we must judge of the case on the lines laid down in connection with the blood changes.

Another important point in connection with the history is the question of whether or not we are dealing with a first attack. Not only is the chance of a remission greater after a first than after a subsequent attack, but after a first one there is a much greater likelihood that, if a remission occurs, it will be more complete and more prolonged than after a second or subsequent relapse. Due regard, however, must be paid to the kind of attack. A patient suffering from pernicious anæmia of a definitely chronic type, although he never reaches a high standard of health, has a better expectation of life than the patient who has had more than one acute attack with an intervening period of apparent health. Most cases have their type stamped upon them early. In all, there is a history of very insidious onset. In cases of chronic type, the disease gradually advances till an extreme degree of weakness is reached. In acute cases, the more urgent symptoms come on rapidly, but are usually a sequel to a slowly progressive departure from health.

Blood Changes.—In a case doing badly, the behaviour of the blood will vary a good deal according to the acuteness or chronicity of the disease.

In the acute cases, the tendency is for the corpuscles to diminish steadily in number, and for the colour-index to rise or remain high. More and more megaloblasts may appear, and these are often at their maximum just before death.

It is impossible to make any statement as to the lowest red-cell count compatible with life. Many cases die before the count has fallen below 1,000,000 per c.mm. In these it is hardly likely that the anæmia, *per se*, is the cause of death. Renal inadequacy, a pneumonia, sepsis, and a variety of other complications whose existence may give rise to no obvious symptoms, often play an important part in determining the fatal issue. We have seen a case recover where the red cells had fallen to 400,000. The patient in question was practically comatose for nearly a fortnight, and then had a remission

which lasted eighteen months. Quincke's count of 143,000 has never been equalled; the patient in that case recovered. Our own lowest count was 200,000, but it was made only a few hours before death.

In cases which are going to recover, the red corpuscles sometimes increase with startling rapidity. There may be a rise of a million a week, although that is exceptional. The colour-index, if it has been high, gradually drops. The corpuscles improve in quality; they become smaller, basophilia and polychromasia lessen, and megaloblasts disappear. A recent case in point was a lady, age 49, whose first count was 800,000, hæmoglobin 25 per cent, colour-index 1·5. Three successive counts at intervals of a week read: 1,050,000, 30 per cent, 1·3; 2,300,000, 55 per cent, 1·19; 3,280,000, 58 per cent 0·9

Some of these cases reach a perfectly normal count in every way, and often pass through a stage during which the colour-index is low. It may drop to 0·7 and remain below unity for weeks. This is to be interpreted as a return to the normoblastic type of blood-formation in the marrow, and is an excellent prognostic sign. If the leucocytes at the same time show a tendency to rise to the normal level of 7000 per c.mm., so much the better

A certain number of cases never reach normal figures for either red or white cells. Many of them have a short period of comparative health and soon drop back again to a condition of serious illness. Others become chronic cases and may last a very long time, with blood-counts far from satisfactory, but with a wonderful degree of freedom from subjective symptoms or active discomfort.

We have been accustomed to group cases of pernicious anæmia as follows, mainly in respect of the blood condition.

1. *Acute Favourable Cases.* The symptoms are marked. Red corpuscles are diminished, but repeated counts indicate a tendency to rise. Megaloblasts are not very numerous, and are mostly of pyknotic type. Normoblasts are present. The colour-index, on repeated examination, shows a tendency to fall. Polychromasia is not marked. The percentage of polymorphonuclear cells is fairly high, and the white-cell count is not greatly diminished. Myelocytes are absent or few.

In these cases a remission to a fairly normal condition may be expected, and the remission may last for years or months.

2. *Acute Unfavourable Cases.*—Symptoms are very marked. Red cells number about a million, and repeated counts reveal a tendency to fall. Megaloblasts are typical, large, and numerous. Normoblasts are very few or absent. The colour-index is high. Polychromasia is marked. The percentage of lymphocytes is high, and the total leucocyte count is low. Myelocytes are numerous.

In these cases a fatal termination is to be expected in less than three months, and it may occur in less than three weeks.

3. *Subacute Cases.* Symptoms are fairly well marked. Red cells are usually just over a million, showing considerable variations in

studied in successive counts. Megaloblasts are fairly numerous. Normoblasts are scanty. The colour index is high. Polychromasia is present. The percentage of lymphocytes is high, but polymorphs may show an increase during a febrile attack. Myelocytes are fairly numerous.

The average duration of these cases is about two years. Intercurrent disease or acute exacerbations usually terminate the case.

4. *Chronic Case.*—Symptoms are not well marked. Red cells tend to remain about one and a half or two millions. Megaloblasts are scanty or absent. Normoblasts are rarely seen. The colour index is about unity. Polychromatophilia is slight. Basophilic stippling is seldom seen. The percentage of lymphocytes is high. Myelocytes are scanty or absent.

Such cases are often fit to work for perhaps six months in the year. Their chief trouble is weakness. Febrile attacks may occur, but seem to have little effect. Nerve symptoms are fairly common, but their incidence does not affect prognosis. Improvement is rare, but the patient may live for many years.

Not infrequently we are unable to make this classification as the result of a single blood examination. In some of the acute cases it may be impossible to say whether the outlook is favourable or otherwise. In these, a second examination in a week's time will often clear up the difficulty.

Thus, a case where the red corpuscles are under one million per c.mm. rarely continues long at that stage; if at the end of a week they have shown a tendency to fall, we may predict a fairly early examination; on the other hand, if the tendency of the corpuscles is to rise, we generally find that our case will undergo a remission. Further, we may expect that if the symptoms have been severe, with fever, yellow colour, etc., the remission will be very satisfactory, especially if the attack, should be the first one. A case of more chronic type, and especially a case in a second or later relapse, is more likely to make less rapid progress, and the improvement will be from invalidism to semi-invalidism rather than to an appearance of complete health.

When a case is at its worst, a very slight alteration in the blood-count may have a very important significance. A rise of 300,000 red cells per c.mm. in a week would almost be sufficient to justify the view of a remission, and a preponderance of the type of megaloblast with small, deeply-staining pyknotic nucleus, rather than the type with large nucleus and open chromatin network, would also be a very favourable sign.

Symptoms. The incidence of such symptoms as sickness or diarrhœa, increase of the yellow tint, or œdema does not necessarily affect the ultimate course of the disease, though any of these would add to the severity of a case in an acute attack. Conversely, the disappearance of gastro-intestinal symptoms is of good omen. The clearing of the lemon-yellow tint, when it has been present, is always

good as indicating that the toxic affection of the liver is passing off. The clearing up is not necessarily attended by an improvement of the blood.

It is important to keep a record of the patient's weight, if possible, because of the tendency to generalized oedema of the adjacent mucous tissue, which does not necessarily show itself specially in the usual sites affected by heart or kidney disease. Thus, a loss of weight associated with a diminution of oedema is a good sign; a gain of weight with increase of oedema is a bad sign; a gain of weight without oedema and with improvement in the blood is a good sign. Oedema of cardiac type is always very bad, and is usually associated with other evidence of heart failure, which requires appropriate treatment, but is rarely recovered from.

Febrile attacks add to the gravity of the condition while they last. The patient may be none the worse, and is sometimes better, after they are over.

Haemorrhages are a serious sign, but are not nearly so common even in the worst cases as text-book statements would lead one to expect. It has been suggested that retinal haemorrhages are not so serious prognostically as others.

We recently saw a case of hepatic pernicious anaemia was complicated by bleeding piles. Each hemorrhage was definitely lowering the blood count. There were megaloblasts, polychromasia, and basophilic stippling of the red corpuscles. The counts were: red corpuscles 1,370,000, haemoglobin 56 per cent, leucocytes 1400, colour index 1.3. We advocated operation, and hysterectomy was successfully performed. A week after operation the red corpuscles numbered 1,600,000, haemoglobin 43 per cent.

The onset of jaundice is a somewhat serious symptom.

It is probable that all cases suffer from some renal inadequacy. The evidence of this is based on our post-mortem experience. When there is clinical evidence of kidney disease, the prognosis becomes much more serious, except occasionally in the puerperal cases.

Any complication of an inflammatory nature nearly always determines a fatal issue. Patches of catarrhal pneumonia may be present without clinical symptoms, owing to the failure of the patient to react. When they are discovered they are to be regarded as likely to shorten the patient's life.

Other complications do not greatly disturb the course of the disease. Three cases of ours, all with a red cell count of 3,000,000 to 3,500,000, and haemoglobin 65 to 72 per cent, underwent operation for gall-stones with no ill effect.

Treatment.—There is little doubt that cases placed in favourable surroundings have a better chance of a remission or recovery than those not so fortunately placed. Hospital treatment for the poor, and skilled nursing for the well-to-do, may make all the difference between a favourable and an unfavourable result.

The patient who can take life easily after a first attack is in an

[illegible]

[illegible] better position as regards expectation of life than one who has to return to either mental or physical work.

As regards medicine, no drug can yet be said to compel successfully with arsenic, and an experienced observer in judging of the way the patient responds to it, and the manner in which it is tolerated. Patients who can take such doses as 15 minims of Fowler's or a similar solution thrice daily are almost certain to do well.

The various organic preparations of arsenic, considerable of sodium cacodylate, arsenobenzol, etc., give no better results than Fowler's solution or the liq. arsenici hydrochlorid., and in our experience they cause more frequent and more severe toxic results than the pharmacopœial preparations.

Many observers have published the results of treatment by salvarsan and its substitutes. Among those who have been intimately acquainted with this drug is Byrom Bramwell, who has published the result of 11 cases. In 4 there was a return to health, in 2 there was a marked improvement, and in 1 slight improvement; 2 showed no improvement, and 2 died. The salvarsan was injected into the buttock, and there was a slight febrile reaction in most of the cases. Boggs has also reported the result of salvarsan treatment in 11 cases. Of these, 2 were practically moribund before treatment, and died. The remaining 9 cases improved. A large number of cases have been reported by other observers; in many instances the results are not nearly so favourable as the foregoing. Our own experience is not encouraging; we have treated 13 cases with intravenous injections of salvarsan, and 7 cases with intramuscular injections of neosalvarsan; the intravenous injections were always followed by a febrile reaction, and often by gastro-intestinal disturbance. Of the salvarsan cases, 7 died, 3 improved, and 3 remained *in statu quo*; of the neosalvarsan cases, 4 died, 1 improved, and 2 seemed to be unaffected. We do not think it can be maintained that the introduction of these drugs has in any way improved the prognosis. Further cases have been treated since the above series was recorded. On several occasions we have 'raced' two similar cases, treating one by salvarsan or neosalvarsan intravenously or intramuscularly, the other by arsenic given by the mouth. In nearly every instance the cases treated by the latter method have won. Some of the salvarsan cases showed no improvement, and only began to improve when arsenic was given by the mouth. It is never justifiable to give salvarsan or its substitutes intravenously in severe or febrile cases. In several that we have heard of, death has directly followed this procedure.

An alternative method of giving arsenic is by the intravenous channel, as liq. sod. arsen., well diluted, the dose beginning with 4 min., and being increased as indicated. This is almost always well borne, and is sometimes successful when arsenic by the mouth fails, or causes digestive disturbance.

Iron does harm rather than good in most cases of pernicious anæmia; sometimes it does good when the colour-index is low during the course of recovery.

Washing out the bowel with normal saline solution is a measure which may be said to improve the patient's prospects of recovery. The administration of intestinal antiseptics is not of such proved benefit.

Among other measures which have been suggested are the administration of bone-marrow, the injection of antistreptococcus serum, and transfusion of blood. We have never been able to satisfy ourselves that bone-marrow does any good. In the published successful cases it has generally been given along with arsenic or other medicines, and the mere transference of a patient from an unfavourable environment to hospital might be enough to determine a remission, especially in the case of a first attack. This explanation probably partly accounts for the successes which have been attributed to antistreptococcus serum, the other factor being a possible benefit from the serum itself, not from its antistreptococcus element. We have never seen a case in which benefit could be attributed to its use apart from these considerations, and we have certainly seen cases in which it did harm.

We have had cases which improved after a course of injections of normal horse serum. We have never seen anaphylactic symptoms in these cases, and if arsenic fails completely, it is worth trying.

Transfusion of blood is a measure which is usually reserved for desperate cases. We have had several apparently brilliant successes, and many failures. Where there are urgent reasons for attempting to prolong the life of a hopeless case for a month or so, it is a measure which may justifiably be tried. It is much more satisfactory to do direct transfusion from a healthy and preferably young subject by the artery-to-vein method, than to use any of the indirect forms. During the last few years we have done about eighteen such transfusions. Only one patient broke down the corpuscles injected, as evidenced by haemoglobinuria, and was in no way benefited. All the others retained the corpuscles, and improved for a longer or shorter time; in several cases a remission followed, though the subsequent history of the disease was not influenced.

In a few cases, which were all febrile, we have tried eusol intravenously. The temperature generally falls after the injections, but the course of the disease has not been affected.

As we have indicated earlier on in this article, cases of pernicious anaemia seem to stand surgical operations surprisingly well, but the reasons for sanctioning any operation must always be clamant.

Splenectomy has often been performed as a treatment for pernicious anaemia; but, while the initial risk is great, the subsequent history of the cases which have been followed up is not such as to encourage us to adopt the procedure.

REFERENCES.—*Brit. Med. Jour.*, 1913, May 24; *Johns Hop. Hosp. Bull.*, 1913, Oct.

G. E. Gaskell
J. Goodall

PERTUSSIS.—(*See* WHOOPING-COUGH.)

PHTHISIS [illegible]

PILES. —(*See* [illegible])

PLACENTA PRÆVIA. The prognosis of placenta praevia [illegible] with several factors, of which the most important are the period of gestation at which the bleeding [illegible] to the [illegible] location of the placenta [illegible] the degree of dilatation of the cervical os, and the type of placenta praevia. In general terms, the [illegible] occurring before [illegible] are of more serious import than those occurring coincidently with the onset of labour pains. Also the more central the placenta, the [illegible] separation occurs in the period in which the expansion of the lower uterine segment proceeds. Thus [illegible] in which the bleeding begins before the onset of labour, there is more likelihood that the practitioner has to deal with a placenta entirely covering the external os. This in itself is serious; but the outlook is rendered more grave by the fact that the obstetrician, in his efforts to arrest the bleeding, is confronted with an undilated cervix.

In estimating the prognosis of any individual case, the state of the patient when she first came under treatment, and the correct selection of the proper method of treatment suitable to that case, have both to be taken into account.

There are three principal methods, each of which is warmly championed by certain authorities, but each of which, to be successful, has its own sphere. These are (1) *Cæsarean section*; (2) *De Ribes' bag*; (3) *Podalic version*.

1. Cæsarean Section.—This is undoubtedly the best method under certain definite circumstances—namely, when (*a*) The hæmorrhage has not been excessive; (*b*) The cervix is not dilated; (*c*) The placenta is central; and (*d*) The child is alive.

With regard to the first of these, it is important to bear in mind that where a woman is already *in extremis* from loss of blood, rapid emptying of the uterus gives rise to a degree of shock that may be fatal. In regard to the second, it is obvious that by extracting the child through an abdominal incision, the difficulties that attend pressures applied through an undilated os are avoided; in fact, bleeding is absolutely controlled from the moment of opening the abdomen. Further, the undilated condition of the cervix probably means that the uterus is free from infection, which is the chief source of danger in Cæsarean section.

Some figures of the more recent results may be given. The number of cases in which Cæsarean section has been performed makes a comparatively small total. Routh[1] has collected the following figures. In 43 cases by American surgeons there were 7 deaths, or 16·3 per cent.; in 26 cases by Krönig and Sellheim there were no deaths. The wide variation in the results is to be attributed to the number of operators in the first series. Bumm has performed vaginal Cæsarean section in 15 cases, with 1 death.

It is in the security of the life of the offspring that Cæsarean section shows so much better results. Thus in the 29 cases performed by Krönig and Sellheim all the children survived.

2. **De Ribes' Hydrostatic Bag.** The use of de Ribes' bag is eminently successful in suitable cases, such as a patulous os, early in or before labour, and in those cases in which it can be ascertained that the placenta does not cover the internal os completely. It is therefore applicable to a large proportion of cases of placenta praevia. Compared to Cæsarean section in the hands of the latter under certain specified conditions, but in consideration of supplies, cases of treating even these cases, place the good cases and the requirements for Cæsarean section are lacking.

The results of treatment by the bag vary considerable in different hands. In 1 hospital cases undertaken under the ordinary conditions of life, it will be found that the mortality ranges between 6 and 8 per cent of all cases. If, on the other hand, figures are taken from special obstetrical hospitals, where the treatment conducted followed and where the chief personal details, the mortality is found to be as low as 2·18 per cent in Pinard's clinic and 2·4 per cent in the clinic of Krönig. The total mortality varies widely, but ranges between 40 and 70 per cent, the average being about 60 per cent.

3. **Podalic Version.** Version by the child is strongly recommended by certain authors as giving better results and being more constantly effective than the use of de Ribes' bag. It is perhaps specially indicated in those cases in which by the time the case is seen dilatation of the os is advanced. Further, in the absence of de Ribes' bag there is no doubt that this procedure forms a good substitute.

When the results are compared with those of the bag, it is seen that the average is nearly as good; but the best figures of skilled obstetricians do not come up to the best with de Ribes' bag. Thus the Rotunda statistics quoted by Tweedy show a mortality of 5·3 per cent in 110 cases during the years 1903–1910; but of the 41 delivered in hospital, there was only 1 death, or 2·5 per cent, which compares very favourably with the results of the use of the hydrostatic bag. There is no doubt that the fœtal mortality is higher in this method (60 to 80 per cent); but of course it depends to a certain extent upon the advancement of gestation and the time of commencement of treatment.

In comparing the three methods of treatment, it should be remembered that in the majority of cases the champion of podalic version as against de Ribes' bag, or vice versa, has become expert in that form of treatment; there ought, however, to be a special field for each method, which its proper application will lead to a successful result. Cæsarean section will become more extensively used in the future; at present many obstetricians would limit its application to about 5 per cent of cases.

The mortality rate of all cases is given by Ellice McDonald as 26 per cent. The most important complication is sepsis, which is

responsible for a fatal termination in at least 60 per cent of the deaths. Next is thrombosis of uterine veins and swelling of the leg. It is found that septic complications occur in 14 per cent of cases.

The more immediate cause of death is the shock of rapid or rough delivery, superimposed on great loss of blood during labour.

The fœtal deaths, in cases where the child is viable, are due partly to premature separation of the placenta and partly to asphyxia during a breech delivery.

In conclusion, the following figures may be taken as indicating the results of all cases of placenta prævia, irrespective of the treatment adopted: In 10,600 cases collected by Ellice MacDonald,[3] the maternal mortality was 7·7 per cent and the fœtal mortality 55 per cent (the maternal mortality in the year 1877 was 23 per cent). Edgar[4] records 3[illegible] cases, with a maternal mortality of 7·5 per cent and a fœtal mortality of 32 per cent.

REFERENCES. [1]*Jour. Obst. and Gyn.* 1914, Jan.; [2]*Ibid.* 1913, Aug.; [3]*Surg. Gyn. and Obst.* 1911, June; [4]*Amer. Jour. of Obst.* 1911, July.

Brayden Glendinning

PLAGUE.—Plague is one of the most deadly diseases known, and carried off about a million people yearly in India during the height of the recent pandemic. The mortality varies in the different clinical varieties of the disease. The pneumonic form is extremely fatal, it being doubtful if recovery ever takes place. In Calcutta every case showing plague bacilli in the sputum died. This form is also extremely infectious by bacilli being disseminated during coughing, but not by ordinary breathing (Strong). The septicæmic form as seen clinically is also almost invariably fatal, numerous plague bacilli being found in the blood. On the other hand, in the much more common bubonic form, recovery takes place in a fair proportion of cases, the death-rate having been 30 per cent among 444 hospital cases examined by the India Plague Commission in Bombay, and it has been about the same in Calcutta.

The essential point in the prognosis is the presence or absence of plague bacilli in the blood-stream, in which they may be found by culture in the majority of cases of bubonic plague, as well as in the clinically septicæmic and pneumonic cases. Thus the India Plague Commission classified their 444 cases in accordance with the number of plague bacilli in ¼ c.c. of blood as follows:—

[illegible] of blood	Cases	Per cent	Deaths	[illegible] per cent	[illegible] per cent
Nil - -	155	34·9	46	29·7	70·3
1 to 10 -	94	21·1	70	74·5	25·5
11 to 100 -	39	8·8	39	100·0	0·0
Over 100 -	156	35·1	153	100·0	0·0

Thus 70 per cent of the cases showing no bacilli in the blood recovered, but only 25·5 per cent of those showing from one to ten bacilli in ¼ c.c. of blood survived, while all of those with higher numbers died. In alternate cases plague serum was used, chiefly intravenously and in large doses up to 500 c.c., but the mortality was 73·7 per cent in the controls and 66·2 per cent in the serum cases: a difference which was considered to be too small to indicate any definite effect of the serum. Yersin's serum gave no decrease in the mortality, while antitoxic serum, prepared in the Lister Institute by means of nucleoproteid extracted from the plague bacilli by Rowland, gave a reduction of 20 per cent in the death-rate, which was confined to the cases showing not more than ten bacilli in ¼ c.c. of blood.

Clinically it is usually impossible to judge in the earlier stages what the prognosis will be. Later in its course the general condition of the patient may give some clue. Delirium, high and prolonged fever, and very rapid soft pulse are bad signs. A fall of temperature late in the disease, especially if sudden, is often only the prelude to fatal collapse. Cases showing primary vesicles at the seat of inoculation of the virus more frequently recover than others, in the writer's experience. Patients who live long enough for the buboes to suppurate, not infrequently recover.

No treatment is known to have any effect on the mortality of the disease, even the specific serum having failed in all but the mildest cases. It has been claimed that early incision of the bubo may lessen the toxic absorption, but this can hardly influence the common cases with numerous plague bacilli in the blood. Good nursing is more effective than drugs.

Leonard R.

PLEURITIS. — The immediate prognosis of pleuritis is good: the remote prospects are not so satisfactory. An investigation of the examples of this disease admitted to St. Bartholomew's Hospital from 1899 to 1903 showed that the average length of treatment amounted to a little over three weeks in cases without effusion, and to rather less than five weeks in cases with effusion.

THE IMMEDIATE PROGNOSIS. This varies with (1) *The nature of the organism*; (2) *The age of the patient*; (3) *The amount of fluid present*; and (4) *The associated conditions*.

1. **Nature of the Organism.**—Out of 47 cases of pleural effusion examined from a bacteriological standpoint at St. Bartholomew's Hospital, 40 were found to be sterile and therefore presumably *tuberculous*, 7 were associated with the *pneumococcus*, and 2 with the *streptococcus*. Other organisms which have been found in this condition are the *Bacillus typhosus*, *Pfeiffer's bacillus*, and the *gonococcus*. There is a greater tendency to the formation of pus in the case of the *pneumococcus* and *streptococcus*.

2. **Age of the Patient.**—In children and young adults the immediate dangers of pleuritis, whether with or without effusion, are small, and the mortality is probably less than 2 per cent.

3. **Amount of Fluid Present.** The amount of fluid present when the case comes under observation has a definite bearing on the mortality. The danger of death from a small effusion is practically nil; but fluid which is present to such an extent that it reaches above the second rib causes positive pressure upon the heart and lungs, and so may cause death. Other causes of death in pleural effusion are thrombosis of the right heart and pericardial effusion. The presence of fine rales on the unaffected side is associated with a graver prognosis. Gee and Horder state that 651 cases of pleuritis between the years 1884 and 1893 gave a mortality of 10·5 per cent., whilst 783 cases between the years 1894 and 1903 gave a mortality of 1·4 per cent. Thus, 1434 cases were associated with a mortality of 4·1 per cent. The great difference between the mortality of the two series is attributed to improved methods of treatment, and especially to the earlier adoption of aspiration in the latter series.

4. **Associated Conditions.** Pleuritis as a complication of existing disease is of graver significance than pleuritis occurring in a previously healthy person. Thus, pleuritis in pulmonary tuberculosis denotes an extension of the original disease; whilst in chronic diseases such as Bright's disease it is of grave significance, and is not infrequently caused by the onset of tuberculosis. Extension of the inflammation to the pericardium tends to prolong the duration of the illness, but does not add greatly to the immediate mortality.

LATE RESULTS.—The remote prospects of pleuritis, whether dry or with effusion, are chiefly concerned with the question whether the cause of the original inflammation is the tubercle bacillus or not. The proportion of cases of pleuritis which are due to the tubercle bacillus is considerable. Some French observers put the percentage as high as 75; few physicians put it lower than 30. Lord followed up 55 out of 82 patients he had observed, and found that 7 had died from pulmonary tuberculosis, 8 were suffering from this disease, and 40 were well. He further found that 25 per cent continued to complain of occasional pleuritic pains.

Fiedler found that of 92 cases of acute pleuritis with effusion, there had been 28 deaths from pulmonary tuberculosis at the end of two years, and that only 21 of the remaining patients appeared to be healthy. Barr found that in six years 22 patients out of 62 had died from pulmonary tuberculosis. Cabot had 117 deaths in five years out of 300 cases; whilst Hedges found that out of 130 cases, tuberculosis developed in 40 per cent in seven years. These figures are supported by two other lines of observation: (1) A positive tuberculin reaction is stated to be present in 75 per cent of cases of pleuritis with effusion; (2) At least 18 per cent of the cases of pulmonary tuberculosis admitted to the chest hospitals in London have a history of pleuritis two or more years before.

The practical deduction is that a large number of cases of pleuritis are to be demonstrated to have a tuberculous origin, and that an even greater proportion are due to this cause. In view of the great

frequency, subsequently, of pulmonary tuberculosis in these cases, it is not too much to say that every primary case of pleuritis, whether with or without effusion, should be regarded as tuberculous, unless the contrary can be proved. If this were done, and all such cases were treated for some time on sanatorium lines, together with tuberculin, a great step would be taken in diminishing the incidence of pulmonary tuberculosis. My own experience in this direction is most satisfactory, and I am tempted to express the opinion that primary pleuritis, when regarded as a comparatively trivial affection is associated in later years with a high mortality from pulmonary tuberculosis; whereas, when it is adequately treated from the commencement as being tuberculous, the after-results are almost as good as the [illegible] ones. [illegible]

PNEUMOCOCCIC PERITONITIS.—(*See* PERITONITIS, PNEUMOCOCCIC.)

PNEUMONIA. The mortality from pneumonia when taken over a considerable number of years amounts to about 1 in 5, or 20 per cent. Thus, Wells collected 465,400 cases with a mortality of 94,826, or 20·4 per cent; Osler and McCrae collected 43,555 cases with a mortality of 21 per cent; in the 7868 cases which occurred in the London general hospitals during ten years, there was a mortality of 21 per cent; in 1065 cases of the Collective Investigation Committee of London, the mortality was 1 in 5·5. Even when the causes which are associated with a high mortality in this disease—such as intemperance, mental and physical deformities, infectious cases, old age—are allowed for, the mortality appears to be 1 in 8.

The character of the epidemic, that is to say, the virulence of the causal organism, affects the mortality, as it may effect the character of the complications. Thus, the 673 cases observed in the Middlesex Hospital from 1880 to 1889 showed a mortality of 17 per cent; but when the different years were compared, the mortality varied from 12 to 24 per cent. This explains why such widely different results are given when the effects of different treatments are compared over a comparatively small number of cases. For example, some authors claim a mortality of as little as 2 per cent, whilst others confess to a mortality of over 30 per cent. As bearing on this point, I would mention that I have known five people die from pneumonia in one house within a fortnight. Tyson quotes an epidemic in a ship's crew, in which 298 cases out of 720 ended fatally.

In a similar way the character of the epidemic may affect the complications; thus, in three months I saw pneumonia followed by abscess of the lung in no less than seven cases.

It has been shown by Dr. Rufus Cole and others that in pneumonia we may have *four types of pneumococci*. *Types I* and *II* are specific organisms in the same category as typhoid bacilli; they appear to account for 60 to 85 per cent of cases. *Type III* [illegible] distributed in healthy mouths, and account for 10 to 15 per cent of

cases. Those of *Type IV* are the most commonly found varieties in healthy mouths, and appear to account for about 25 per cent of cases, the infection here being probably autogenous. The different types have a different virulence, and consequently the prognosis in a given case will be affected by the type of organism present. In the prognosis of a case of pneumonia, therefore, we require to know the type of pneumococcus present, and we may hope that as observations on this point accumulate, we shall be in a much better position to estimate the probable course of a given case. For example, it has been found possible to manufacture immune horse serum for *Type I*, with the result that in a limited number (78) of cases treated in the Hospital of the Rockefeller Institute the mortality was 8 per cent, as compared with 25 per cent in similar cases untreated by the serum.

As regards age, it would appear that pneumonia is especially fatal to children under two years of age, and to old people. With regard to children, Gossage, in observing 986 cases under ten years of age, found a mortality of 13·8 per cent. Of these, cases under two years of age gave a mortality of 26·4 per cent, whilst above this age it was only 6·2 per cent. These figures are borne out by most observers: and in most epidemics of pneumonia, children of from five to ten years of age have the disease in a mild form, which often aborts on the fourth day. I have seen recovery in one case at the age of fourteen from a typical attack where it was stated that the child had had fifteen or more similar attacks.

Various factors influence the prognosis. The mortality in hospital cases is greater than in private practice: in drunkards it is probably at least double. Although women are less frequently attacked than men, it is stated that their mortality is greater. Again, the mortality is greater in negroes than in white people, in debilitated persons than in those previously robust, and is much increased when there is associated disease such as arteriosclerosis, severe cardiac affections, chronic nephritis, or diabetes.

With regard to the position and extent, it is stated that right-sided lesions are more fatal than those on the left, and it is generally held that apical lesions are more dangerous than basal ones, more especially in attacks during old age. The extent of lung involved affects the result, but appears to exert rather less influence than might be expected, as may be seen in the following tables of Osler and McCrae:

MORTALITY AS AFFECTED BY EXTENT OF LUNG INVOLVED

1 lobe involved in 21 per cent				1 lobe involved in 40 per cent				
2	..	8		2	..			[illegible]
3	..	31		3				[illegible]
4	..	9	..	4	..	..	..	1

The effect of complications has no great bearing on the total mortality from pneumonia, as they are, comparatively speaking, uncommon. Their effect on the cases in which they occur is greater. Thus, of the 7868 cases observed in the London hospitals, there were only 290 cases of empyema, or 3·7 per cent, of which 88 were fatal, or about 30 per cent; 125 cases of pleural effusion, or 1·6 per cent, of which 13 were fatal, or about 10 per cent. Pericarditis only occurred in 1 per cent of these cases, but of the fatalities 10 per cent were associated with this complication. In children, convulsions in the early stages have little significance, but in the later stages they are associated with a higher death-rate. Herpes is held to be a favourable sign; thus, Gissler noted the presence of herpes in 182 out of 421 cases, and found the mortality less when this complication occurred.

The degree of toxæmia and the reaction to it are really the most important factors in estimating the outlook in a particular case of pneumonia. For practical purposes these must usually be estimated from a consideration of the temperature, pulse, and respiration. The following tables of Prebles on the relation of the temperature, pulse, and respiration rate to the mortality, are therefore of interest.

It will be seen that when the temperature is low—i.e., below 100°—or above 105°, the mortality is greater than the average; that when the pulse is above 130 the mortality is more than doubled; and that when the respirations are more than 50 the mortality is 50 per cent or more.

TEMPERATURE AND MORTALITY.

Under 100°	17	6	35·2
102	220	52	23·4
103	302	83	27·4
104	408	109	26·7
105	386	99	26
106	148	45	30·5
Over 106	34	23	68

PULSE-RATE AND MORTALITY.

Under 100	57	2	3·5
110	123	7	5·7
120	142	18	12·6
130	288	62	21·5
140	143	68	47
150	125	74	59
Over 150	83	64	77

RESPIRATION RATE AND MORTALITY.

Under 30	77	5	7.1
40	247	36	14
50	384	116	30.2
60	123	62	50.4
70	98	61	62.2
Over 70	23	14	60.6

If the infection causes little response, as is often the case in old people, and the temperature remains low, the outlook is grave. If the infection is severe and causes marked toxemia, as shown by temperature, pulse, and respiration, the mortality is greatly increased; but when the infection is met with an adequate response, and the temperature is below 105°, the pulse rate below 130 and the respiration rate below 40, the mortality is about 1 in 5.

The action of the heart, and especially of the right ventricle, is always significant. When the right heart becomes distended and the pulse in addition to being rapid becomes irregular, the outlook is grave. When auricular fibrillation occurs during the attack, even though the crisis may appear to have been safely passed, the case always ends fatally.

Although the outlook may appear hopeless, treatment, especially with cardiac and respiratory stimulants such as alcohol, digitalis, and strychnine, should be continued and pushed until a definite effect is obtained, for in no disease are there so many recoveries from an apparently inevitable death.

Different forms of treatment, such as the use of vaccines, the intramuscular employment of digitalis, or the use of various other methods, have not been shown to have any markedly different results in a sufficiently large number of cases. In a limited number of cases of *Type I*, the use of immune horse serum, as mentioned above, appeared to have a marked effect upon the mortality. Patients moved to hospital on the first day of the disease appear to have a better prognosis than those moved on the third or fourth. This is probably explained by the effect of movement in inducing excessive autoinoculations, as in other cases of bacterial infection, and emphasizes the necessity of limiting the movements and examination of the patient as much as possible during the acute stage of the disease.

Those who suffer from an attack of pneumonia not infrequently have another attack later in life. Some authors put this tendency to a second attack at as high a figure as 50 per cent.

[illegible]

PNEUMOTHORAX.—The prognosis differs greatly according to the cause and to the condition of the patient in whom it occurs.

In the spontaneous form, which is chiefly dependent on the presence

of emphysema, infective agencies are absent, and consequently one of the most serious complications is absent also. Further, in this form effusion is rarely found. In 58 cases studied by Fussell and Rissman, effusion only occurred in one instance. Adams, however, reported a case in which effusion lasted for four years. The outlook in this form of pneumothorax is good, and recovery is the rule, provided the general condition of the patient is good. It may occur in a week, or it may be delayed for several months. In Fussell and Rissman's series only one death resulted. On the other hand, when pneumothorax is a complication of advanced emphysema, with severe overtaxing of the heart, it is a grave complication and usually fatal.

In the traumatic form, the prognosis depends chiefly on the character of the wound, and more especially on the question whether septic complications occur. In the absence of sepsis the outlook is good. Cases which occur as the result of thoracentesis usually do well.

Cases in which pneumothorax is due to the perforation of the lung by an emphysema, often do well after the necessary surgical measures have been taken.

Cases associated with gangrene, rupture of septic infarcts, or bronchiectasis are, practically speaking, always fatal.

Pneumothorax occurring in a case of pulmonary tuberculosis is usually attended with a grave outlook, as it is most commonly met with when the disease is advanced and both lungs are extensively affected. Samuel West, as the result of observations on 101 cases, gives the mortality as being about 70 per cent; Saussier recorded a fatal result in 131 out of 147 cases, that is to say, a percentage of 90. Of 58 cases of pneumothorax collected from the post-mortem records of the Brompton Hospital, the greatest duration of life was twelve years, the least duration ten minutes. On the other hand, cases with a much longer duration are on record. Dr. Williams reported a case, occurring in his private practice, in which life was prolonged for twenty-one years.

It would appear that recovery may take place in from 10 to 25 per cent of cases; and further, that in a small number of instances the occurrence of pneumothorax may be beneficial to the patient, leading to arrest of the disease, in the same way as the artificial compression of the lung by nitrogen is sometimes followed by great improvement or complete recovery. I have personally seen recovery after pneumothorax with arrest of the tuberculous disease in two cases.

The prognosis in pneumothorax is therefore bad, when viewed as a whole. Whether it is immediately associated with fatal results depends on the extent of the primary disease and the general condition of the patient, that is, his capacity to withstand the great shock which is caused by the production of this complication. The practice of removing the air from the distended pleura at an early stage has certainly decreased the immediate mortality. If the pneumothorax is sharply limited by adhesions, and small in extent, it may be without effect on the duration of life, and even escape notice at the time of

compression; but in the case of a general pneumothorax the chief consideration at the time it is produced is the effect of the immediate shock.

If the stage of shock is survived, the chief considerations in estimating prognosis are the general condition of the patient, the extent of disease in the other lung, and the occurrence of septic complications. When a hydropneumothorax has become established, the condition remains unchanged usually for months, or exceptionally for years. It is rare, however, for complete recovery to take place under these conditions, as the primary disease usually continues to extend. Even if pneumothorax supervene, the patient may live for several years.

Arthur Latham.

POISONING, ARSENIC.—(*See* ARSENIC POISONING.)

POISONING, LEAD.—(*See* LEAD POISONING.)

POISONING, MERCURIAL.—(*See* MERCURIALISM.)

POLIOMYELITIS, ACUTE ANTERIOR.—(*See* INFANTILE PARALYSIS.)

POLYCYTHÆMIA (SPLENOMEGALIC POLYCYTHÆMIA, ERYTHRÆMIA). This disease is rare, and few observers have had sufficient experience to lay down any very definite statements regarding its probable course.

Many cases show little change, either for better or worse, for prolonged periods.

Temporary exacerbations of the cyanosis may occur, and, on the other hand, periods of remission of symptoms have been recorded.

Complications are not very common. Erythromelalgia has been noted in several cases. Hæmorrhages are not infrequent, but as a rule their effect is beneficial to the patient.

Many intercurrent affections may arise. Among those which have been recorded are jaundice and cirrhosis of the liver, valvular disease of the heart, arteriosclerosis, thrombosis and cerebral hæmorrhage, bronchitis and emphysema, kidney disease, and affections of the central nervous system. Other complications which have been recorded have no apparent connection with the polycythæmia.

A fatal outcome is usually associated with an exacerbation of the cyanosis, a vascular complication, or an inflammatory intercurrent affection.

No special line of treatment appears to influence the course of the disease, though symptoms may be alleviated.

Venæsection has been followed by benefit, especially when the blood-pressure is high. The results of application of x rays have been inconstant. A diet poor in iron has been tried with some degree of success. No benefit is to be expected from splenectomy.

G. L. Gulland.
A. Goodall.

PREGNANCY, ALBUMINURIA OF. (See ALBUMINURIA OF PREGNANCY.)

PREGNANCY, ECTOPIC. (See ECTOPIC PREGNANCY.)

PREGNANCY, VOMITING OF. (See VOMITING OF PREGNANCY.)

PROGRESSIVE MUSCULAR ATROPHY. (See MUSCULAR ATROPHY.)

PROLAPSUS RECTI. (See RECTAL PROLAPSE.)

PROSTATE, CANCER OF. About one-fifth of the cases of enlargement of the prostate are due to cancer. A very excellent study of 111 cases was published a few years ago by Young.

The course is very variable. A few die within a year, the majority in from two to three years, but a considerable number live for three or four years, and a few live even longer. Some patients have had bladder trouble for twenty years, so it is probable that the cancer may start in a prostatic adenoma in the manner of a sample hypertrophy. There is therefore frequently plenty of time for adenoma to undergo the cancer and treatment to be for the growth has become irremediable.

Treatment. So far the results are not very encouraging. The cases are wholly unsuitable for extensive operations. Four of 11 such patients at St. Thomas's Hospitalized.

Young's personal results are better in early cases. His radical operation with wide removal has apparently cured 12 patients out of 9, but leaves well four and six years respectively, another lived three years. Out of 19 patients treated by his radical method, as used for inoperable cases, 4 lived longer, 1 obtained some relief, 2 died in consequence of the two, three years respectively, and 2 others were apparently cured. 1 lives well so long as six years afterwards.

In 39 cases, called 1 for was published with no operation. 4 offer "immediate cure" and out of 23 cases 1 lived over 3 years, two years.

Judd found evidence that 75 out of 122 cases were in a hypertrophied prostate. Of 82 cases 5 lived up after operation, 21 died within six months, and 5 others 20 for an unknown interval. 11 were well three years after operation, 1 two years after, 16 two years, and 20 one year after. Apparently 6 were living when reported.

Young: *Ann. Surg.*, 1906, [illegible] 1134. Judd: *Internat. J. Surg.*, 1915, xxv., 17.

J. Bland-Sutton.

PROSTATE, HYPERTROPHY OF. We shall here speak only of cases of simple hypertrophy of the prostate, reserving malignant affections of the gland for a separate article.

PROGNOSIS APART FROM OPERATION. It must be borne in mind that enlargement of the prostate is a progressive disease. Acute exacerbations due to inflammation may subside under treatment, but we have no means of checking the steady growth. When symptoms

[illegible] appeared, therefore, there is no hardship for them to get water instead of better. In a fair proportion of cases, however, the unfortunate man may live for years with or without the regular use of a catheter, any advance in the size of the prostate being very slow indeed. Much depends on the patient's age. Cases of hard water may intervene before the prostate trouble proves fatal, whereas a patient in the fifties and in good general health, difficulty with micturition and urinary tract, likely to shorten life very considerably. The most favourable cases are those in which, owing to some delicate cause, such as lack of opportunity to pass water, or a long continued attack of acute retention is precipitated. After a few days of free catheterism, voluntary power of micturition may be regained for a time. Much more commonly the rot about is permanent.

Ordinarily there are two successive stages: (1) Difficulty in micturition with straining. (2) Frequency of micturition, especially interfering with sleep. (3) Ventral chronic retention of urine, necessitating the occasional or regular use of the catheter. (4) Chronic cystitis, the discomfort and frequency may get much worse. (5) Secondary infection of the kidneys, leading to uremia.

The total course varies so much that one cannot form a prognosis in a particular case, each patient's prospects separately. Unintelligent old men often present themselves, obviously, for a few weeks before the total retention, and give a history of bladder trouble only for the past month or so. On the other hand, a patient may have symptoms of an enlarged prostate for eight or ten years, but this is usually favourable.

Many patients pass into an extremely miserable condition. They may become unhinged, and chronic general diseases may ruin their reputation. Later, great frequency of micturition, pain, sleeplessness, loss of sleep, and calculus formation due to commencing decomposition of the urine, wear out their strength. When marked pain and frequency are present, the patient has in the majority of cases not many months to live, apart from surgical intervention. Loss of appetite, thirst, sweating, drowsiness, hiccoughs, or convulsions, emaciation, uremic breath, foodstuffs to catheter fever, and uremia with urea output below 15 grains a day, show that uremia has already begun, and death is not far off. Retention is a sign of great severity, unless most carefully treated; it leads frequently to cystitis, and if all the urine is drawn off at once from a patient with chronic retention, fatal suppression of urine is not at all uncommon, owing to the dilated ureters allowing a sudden fall of pressure in the kidneys.

In estimating the prognosis apart from operation, the following points are to be taken into account: (1) *The patient's age*, bearing in mind that the younger the man is, the more will his natural expectation of life be increased. (2) *The apparent rate of progress*. (3) *How well does and can he manage a catheter, and keeping of urine*, and (4) *The question of complication or of signs of uremia*. The questions of *malignancy* and

[illegible] the prostatic [illegible] impossible to make a [illegible] diagnosis of [illegible] and one case in [illegible] of prostatic enlargement [illegible] [illegible] It is all but certain that [illegible] and [illegible] [illegible]

Prostatectomy [illegible] Operations. — Of operations for enlarged prostate we may mention *suprapubic*, *retrograde*, *perineal* prostatectomy, *Bottini* operation, the *perineal* [illegible] and [illegible]. We may say at once that the two last named are almost [illegible].

Vasectomy was [illegible] and [illegible] but seldom produced a [illegible] cure.

Castration was [illegible] successful in reducing the size of the prostate, but it often failed, and was invariably very [illegible] to the patient, had a decided [illegible], and led to mental disturbance, [illegible] in a large number of cases. Needless to [illegible] it was too [illegible] to an old man who were already [illegible] for death.

Suprapubic Prostatectomy. — Largely owing to the teaching of Freyer, this is the most [illegible] operation in [illegible] the perineal [illegible] being the favourite on the Continent and [illegible] American clinics.

The mortality rate is found to vary much according to the condition of the patient at the time the operation is undertaken, and there is a great difference between the figures which could be quoted. Freyer in 1912 reported a series of 1000 cases with only 55 deaths, but at the same meeting Mr. Greenwood stated that the death-rate in Guy's hospital for the year 1907 was 40 per cent.! This latter figure is undoubtedly too high at the present day, because hospital surgeons are not now so ready to operate in one stage upon patients whose kidneys are already affected, and general practitioners are beginning to send in cases that are not so *desperate*. The English hospital statistics at the present time show a death-rate of about 20 per cent. At two Bristol hospitals during the years 1906 to 1912 it was decided higher than this, early cases being few. Out of 68 patients, 24 died, a mortality of 35 per cent. At one of the largest hospitals, according to Wade, out of 161 operation cases in ten years 54 died. That is 33 per cent. At St. Thomas's Hospital, 1906 to 1910, of 69 cases 14 died, a mortality of 20.3 per cent; and at four other London hospitals during the same period, 16 died out of 76. It must be remembered that many of the patients who succumbed in hospital were almost desperately ill, and the genuinely favourable cases are not very well represented, because many surgeons do not recommend operation to patients who could be treated by catheterization.

During the past five years there has been a great improvement in hospital statistics. At the Bristol Royal Infirmary the present death-rate is about 10 per cent.

The increased safety is due to better selection of cases, and to the use of a two-stage operation when necessary.

In the hands of individual surgeons who prefer operation to catheter, and whose material includes a large proportion of cases

[illegible]

[illegible] from private practice, the mortality is lower. Freyer [illegible] mentioned lost 55 out of 1000 cases. Thomson Walker in [illegible] of over 400 had a death-rate of 5 per cent. Yet both these [illegible] to have accepted bad cases: Thomson Walker declares [illegible] he exercised practically no selection except in cases where any [illegible] of operation would obviously be foolhardy, and Freyer remarks [illegible] many of his patients were desperately ill, usually more or less [illegible] on [illegible] 181 had vesical [illegible] of these 85 per cent. death and 62 were [illegible].

We may conclude, therefore, that the mortality of suprapubic prostatectomy would, in capable hands, be well below 5 per cent in patients with sound kidneys and little or no [illegible].

The causes of death are uræmia (24 out of Freyer's 55 fatalities), shock, heart failure, and chest complications.

The results of suprapubic prostatectomy are no doubt remarkably good. Freyer claims that every case of his surviving the operation [illegible] a perfect result, except one patient with atony of the bladder [illegible] has never seen retention, incontinence, fistula, or loss of sex-power. He does not, however, give data showing how many patients were [illegible] or heard from at any considerable period after the operation. He claims, and all surgeons will corroborate the statement, that atony [illegible] the bladder, even when it appears to have already come on, recovers wonderfully after removal of the prostate.

Thomson Walker has carefully studied 112 cases of his own, followed [illegible] at least eighteen months. The results were as follows: Incontinence of urine, 0; atony of bladder, 2; loss of sexual functions, 11; cystitis occasionally persists; development of vesical calculus, 6; suprapubic fistula, 2; suprapubic hernia, 2; recurrent haemorrhage, 1. All the rest were restored to perfect health; and it must be remarked that in the atony cases, in most of those with loss of sexual functions, and in three out of the six cases of stone, the trouble was but a persistence or recurrence of the pre-operative condition. One of the fistula patients was cured by a second operation. It will be observed that, omitting the patients with impotence, cystitis, or calculus, 105 out of 112 were cured.

Of 26 patients at St. Thomas's Hospital and followed up, 20 did excellently, 2 developed a stone, 3 had incomplete control (two of these were possibly cancerous), and 1 had a suprapubic fistula.

Of 32 cases operated on in two Bristol hospitals, 24 were perfectly [illegible], and 2 were only troubled by some degree of frequency. Of the [illegible], 2 patients developed a stone, and in 1 of these the suprapubic [illegible] failed to close; 2 had some incontinence; and in 3 patients there was little or no relief, straining and difficulty persisting; one [illegible] two of these were possibly cancerous. All these were followed at least a year.

The sexual functions were completely lost in only 12·5 per cent of Thomson Walker's cases; many of these were aged men, and in some there was impotence or loss of desire before operation. Occasionally

a troublesome degree of stricture of the commencement of the urethra may follow.

Perineal Prostatectomy. This operation is performed in several different ways, some of which do not conserve the ejaculatory urethra as well as others; we have material for studying the end results of Young's method, which is probably the best. The special points are the careful hemostasis and the preservation of the ejaculatory ducts and mucous protuberance of the base of the bladder.

MORTALITY OF PROSTATECTOMY.

	Dixon	1000	55	5.5
	Dorrance, Wesson	over 100	—	5
Suprapubic	St. Louis Hospital, 1906 to [illegible]	69	14	20.3
	Lewis Hospital, 1906 to [illegible]	76	16	21
	Lewis Hospital, 1906 to [illegible]	68	24	35.3
	Accepted Work	164	54	33.4
Perineal	Young	450	17	3.8

The mortality of the 450 cases was 17, that is, 3.8 per cent. There were 128 consecutive operations without a fatality. Some of the deaths might have been prevented by more careful washing out of the bladder beforehand.

The patients got about sooner than after the suprapubic operation, more than half going home in a month.

INCIDENCE OF PROSTATECTOMY.

Suprapubic	Dorrance, Wesson St. Louis	112	90	80	4	0	2	6	2	[illegible]
	Hospital	26	20	77	0	0	0	2	1	0
	Lewis Hospital cases	32	24	75	0	2	3	2	1	0
Perineal	Young	403	364*	89	0	3	12	7	27*	0

[illegible]

*Incontinence was [illegible] by Young in 103 cases, for at least six months in 18 out of 26. Of these, 79 died of various intercurrent diseases, and 324 gave a good result in the report.

Of the last 12 cases, he had water on three hours or more by day, about [illegible] operation, [illegible] 30 days, and have had to use once or twice. Although

29 per cent required the catheter before operation, only 4 patients were still wholly dependent on it, and 8 more had some partial obstruction. In all the rest there was a perfect result with regard to micturition. None had incontinence night and day; 3 only by day. All the 79 patients who died did well as far as urinary troubles were concerned, except 2 who are included in this summary. The principal drawback of the perineal route is persistence of the fistula: in 27 of Young's cases it was open three months after operation, but it is not stated in how many of these it remained open permanently. Some other advocates of the perineal operation report 3 to 6 per cent of cases of persistent fistula, and 2 to 4 per cent of cases of recto-vesical or recto-urethral fistula.

SEXUAL POWER (ERECTIONS) LOST AFTER PROSTATECTOMY

operando	Thomson Walker	- --	12·5
remoto	Young	- - 133	25

Ejaculations were retained in 59 per cent of 133 cases in which they were normal before operation, and 75 per cent still obtained orgasms.

In Young's hands the perineal operation certainly gives better results both immediately and remotely, than suprapubic enucleation, but it is doubtful if this would be the universal experience. It is best perhaps for small hard prostates, but Frever's method will still have a place for large glands that shell out easily.

Bottini's Operation and Young's Bar-punch Operation.—These are indicated in cases where the prostate is not enlarged, but a median groove distends the urethra. Young reports 67 cases treated by his method without a death. Four of these were failures, and 63 gave good or perfect results.

REFERENCES: Frever, *Lond. Med. Gaz.*, 1912, ii, 865; Thomson Walker, *Lancet*, 1912, ii, 261; Page, *St. Thomas's Hosp. Rep.*, 1910, lvi; Young, *Ann. Surg. and Obst.*, 1911, xiii, 269; Young, *Keen's Surgery*, vol. vi, 659; *Lancet*, Nov., 1914, lxxx, 821.

J. *Rankin Stout.*

PROSTATIC CALCULI. These are not very often met with, and seldom require removal. Incontinence of urine is apt to follow the operation. In a case under Mr. Morison's care seen by the writer, the patient became and remain after repeated removal.

J. *Rankin Stout.*

PSOAS ABSCESS. We shall confine our remarks under this head to tuberculous abscesses, arising in the great majority of cases from disease of the spine.

Material available for jumping to a sound conclusion as to the

prognosis of this disease is very scanty. The condition is rather uncommon, so that no one surgeon is able to present a record of a long series of personally-observed cases. We shall here base our study upon the not very recent figures of Lovett, relating to 54 patients under fourteen years of age treated at the Boston Children's Hospital, and upon the notes of 56 cases treated at the Royal Infirmary and General Hospital, Bristol.

The great majority of the cases were, of course, operated on. Nevertheless, recovery apart from operation is not impossible, given rest and favourable conditions. Of 5 children not operated on at Boston, 2 were healed; and 2 probable psoas abscesses at one of the Bristol hospitals, treated by rest, have made an excellent recovery. Such a happy issue must be regarded as exceptional; usually the abscess will burst and become infected with the organisms of suppuration, which of course makes the outlook much less hopeful.

At the Boston Children's Hospital the routine treatment was opening and draining by a tube or gauze. More modern practice would prefer, in favourable cases, to evacuate the pus and sew up again; and the results might have been better if this course had been adopted. Of the 49 patients operated on, none died within a month; 6 were lost sight of. Of the 43 followed up for periods from one to ten years, 17 died, and 26 were still alive. The fatal results usually occurred more than a year after the operation. Of the 26 survivors, 12 were cured, 10 much improved, but still suffering from sinuses or pain in the back, and 4 were little or no better. These results, and those of the Bristol cases, are set out in the table subjoined.

RESULTS OF OPERATION FOR PSOAS ABSCESS.

	Cases operated on	Died at or [illegible]	Cases followed	Cures or [illegible] cures	Much improved	No change	[illegible]
Boston Children's Hosp.	49	0	43	12	10	4	17
Two hospitals, Bristol	54	2	37*	17	3	4	13
Total	103	2	80	29 (or 36 per cent.)	13 (or 16 per cent.)	8 (or 10 per cent.)	30 (or 37 per cent.)

* [illegible] children [illegible] years of age [illegible] six [illegible].

The Bristol cases were followed for periods from eighteen months to twelve years (very few under two years). The infected cases were usually drained, and the purely tuberculous abscesses evacuated, scraped, and closed. The results are about the same as the American ones. It will be seen, combining the figures, that the immediate mortality is low (about 2 per cent.); that, of 80 cases, about a third

are cured or show only a trifling sinus, a third have died since, and the remaining third are either improved or *in statu quo*, the wounds remaining open and the back still painful. Contrary to expectation, the results in patients over sixteen were very decidedly better than in children: of the former group, 13 out of 23 did well. The figures are, however, too small to be reliable on this point.

In fatal cases, death usually takes place after many months or years of invalidism; albuminoid disease, chronic suppuration, and exhaustion, and tuberculous meningitis figuring largely in the final issue. The average time in 11 Bristol cases was between two and three years.

With reference to the prognosis in individual cases, the outlook is much graver if secondary infection with cocci takes place. Lovett shows that fever is of bad omen: thus, of 10 febrile cases, 3 lived, 7 died, mortality 70 per cent; of 30 afebrile cases, 20 lived, 10 died, mortality 33 per cent.

The development of a fæcal fistula is extremely grave.

With reference to the mode of operation, Lovett gives evidence which tells against the practice of opening both in the groin and the lumbar region; but it must be borne in mind that the double incision was probably adopted for the larger abscesses. His table is as follows:

RESULTS OF DIFFERENT OPERATIONS (LOVETT).

Iliac opening	11	8	3
Lumbar opening	13	9	4
Iliac and lumbar opening	13	4	9
Gluteal opening	5	4	1

He believes that a better result is obtained if the patient is kept sitting or standing after operation, to promote drainage.

We may conclude, therefore, that of cases of psoas abscess, about a third recover more or less completely, a third die, and of the remainder some improve, and some go on for years in a wretched state. The average duration of life in fatal cases is two to three years. According to the figures given here (too small to generalize from), it would appear that adults do better than children; this is important.

REFERENCES. Lovett, *Boston Med. and Surg. J.*, 1901, cxlv, 463.
1. *Bristol Stud.*

PSORIASIS.—We have to consider (1) *The immediate prognosis*; and (2) *The liability to recurrence*.

1. **Immediate Prognosis.**—This will depend upon whether the patient can or cannot give himself up entirely to treatment. The palliatory treatment of an extensive psoriasis is most unsatisfactory,

and the patient may not be free from the eruption for years; but in a long-standing case, the patient may, perhaps not unwisely, object to lying up for the removal of an eruption which does not trouble him, and which he knows by experience will certainly recur. If the sufferer from psoriasis can give himself up to treatment, and will submit to chrysarobin, the eruption can in many cases be removed in three or four weeks. A longer time will usually be necessary if the scalp is badly involved, as chrysarobin cannot be used in this region. No other remedy is so rapid in its action; if the drug be objected to—and it has many drawbacks—a longer time must be allowed for treatment. The drugs next in efficiency are the tars, oil of cade, pyrogallol, and the derivative of the latter, eugallol.

An extended experience has shown the value of the *x* rays in the treatment of psoriasis when the areas are limited. The periods of intermission are certainly lengthened in many instances, and the patient is enabled to continue at work without the constant application of ointments.

As regards the value of internal treatment, the writer cannot say that he has been greatly impressed by any measure. Arsenic, given either by the mouth or, probably more effectively, by injection, is certainly of some value. Hutchinson stated that he had cured cases by arsenic alone; and the writer knows cases in which its timely use, together with sulphur alkaline baths, cuts short an attack.

2. **Liability to Recurrence.**—It is impossible to give a hopeful prognosis as regards recurrences in psoriasis. In some cases, the patient may be free for several months, or a year or so; in others the intervals last for a few weeks only. Recurrence sooner or later is the rule, and nothing that we know at present can prevent it. The patients are often in the best of health, and in some instances they only lose their eruption when they are out of condition. Relapses are less common where the scalp can be kept free from disease, and the eruption is less liable to recur if completely removed by treatment; but it is at present impossible to speak more favourably.

A. H. Sequeira.

PUERPERAL MANIA.—(*See* MENTAL DISEASES.)

PUERPERAL SEPSIS. In puerperal infections, the clinical manifestations are of immense importance in coming to a decision as to the prognosis in individual cases. With regard to the results of treatment, so much variety exists in the classification of cases, that it is difficult to compare the results of different reporters. Thus while for some American and English authors the mortality is lowered by half when vaccines are used, other writers, especially Continental authorities, absolutely ignoring vaccine therapy, can show very similar records. The truth would appear to be that there is an average mortality figure for each group of puerperal sepsis, and a lower figure where appropriate treatment is applied in each case.

The last few years have seen an interest aroused in the question

[illegible] thrombophlebitis and its surgical treatment, with results which are not at first sight encouraging, but may readily be improved upon.

We give some figures relating to puerperal infections in general, compiled in large measure from those quoted by Jeannin. The death-rate from puerperal infection in all labours is given as 0·25 to 0·3 per cent., and the mortality of puerperal sepsis represents about 10 per cent. of all cases, including, of course, very many mild cases. If only the more serious cases of puerperal infection are considered, the mortality is at least 50 per cent.

The following table shows the relative proportion of the different kinds of fatal infections, with the respective death-rates.

TABLE SHOWING THE RELATIVE PROPORTIONS OF THE DIFFERENT KINDS OF FATAL INFECTIONS, WITH THE RESPECTIVE DEATH-RATES.

Pure septicæmia	40	95
General peritonitis	20	85
Phlebitis	15	72
Septicæmia and metastatic suppuration and abscess	15	75
Pneumonia and pleurisy	7	

A rough indication of the prognosis is also to be gained by a knowledge of the infecting organisms. Streptococcal organisms are obtained from the uterus in 50 to 75 per cent. of all cases; they are the most virulent. Streptococcal cases are much more generally fatal than those due to any other organism. Staphylococcal infections seldom give rise to a septicæmia, but commonly enter into local lesions. *B. coli* infections are comparatively rare, but are said to be dangerous on account of their action on the liver. Gonococcal infections most frequently end in tubal disease and adhesions, which long under-stand; it is seldom that they prove directly fatal.

It has been noted that infections which have taken on an epidemic character are as a rule much more virulent than the average run of sporadic cases. The explanation is to be found in an acquired virulence during the passage through the human body.

Prognosis from the Clinical Standpoint. It is a good thing to use the following rule before one when investigating a case of puerperal sepsis: The gravity of an infection is in inverse ratio to the intensity of the local reaction; that is to say, when there is nothing [illegible] to account for the symptoms, the outcome will be guarded in proportion. The following factors are of varying importance:

The condition of the patient, especially as to preceding medical [illegible] which have resulted in extensive bruising of the pelvic [illegible]; medical wounds may demonstrate a lowered power of resistance

Case of albuminuria, of eclampsia, and of severe hyperemesis come under the same category, and provide a large proportion of cases of puerperal infection, fatally.

In comparing post-abortum with post-partum cases, it is found that the latter are generally speaking much less favourable. An exception is to be made respecting the cases subsequent to criminal abortion, in which the mortality exceeds regularly 5 per cent.

As a general rule, the death-rate is higher in cases with declared puerperal sepsis *brought in from outside* than in cases occurring within an institution.

The date of onset of the fever has an important significance. An infection which is evident within 24 to 36 hours after labour will come usually from the outset; while cases occurring after the sixth day will almost certainly show only local lesions of a suppurative character.

The severity of the general symptoms bears a direct relation to the gravity of the septic infection. Thus, a temperature maintained at about 104°, a pulse of 110 to 120 per minute and a tongue, dark in spite of oscillations in the temperature reading, with a dry tongue and loss of sleep, are bad signs.

The correspondence between the pulse and temperature curves should be noted; as in bad cases the pulse is constantly higher than the temperature curve, and does not fall when the temperature is lowered. A slow pulse, irrespective of the temperature, may be taken as a good sign. In the worst cases there is incoherence and dyspnœa, and the extremities become cold. In the absence of vomiting or diarrhœa, and while the appetite remains and the patient receives nutrition, there is always hope that the resistance to disease will be effective.

Albumin in the urine and a diminution in quantity of the latter must be taken as unfavourable.

Jaundice is seen in cases of general peritonitis, and indicates wide extension of the latter. It is rare in such cases for recovery to take place. The condition must not be mistaken for the icteric tinge not infrequently seen in cases of severe septic infection with high temperature; such a tinge occurs in nearly all fevers, and does not imply a serious lesion of the liver tissues.

The blood furnishes information in the first place bacteriologically, as indicating the presence or absence of micro-organisms. It is of some significance to try to distinguish the true septicæmias from the occasional bacteriæmias. Thus, a culture from the blood within an hour or two of a rigor will almost certainly contain bacteria; but the same patient's blood a few hours later may or may not reveal the presence of organisms. Such a discontinuous bacteriæmia has a much better prognosis than the continuous. Again, cultures taken when death is approaching are frequently found to reveal a *B. coli* infection, which is probably not the true causal agent. The presence of microbes does not necessarily indicate a bad prognosis, as Westerman, in 96 cases of puerperal fever, found definite evidence of organisms

in the blood, continuously or discontinuously, in 10 per cent. The mortality in these cases was: in the group treated by vaccines, 42 per cent.; in the group treated by ordinary methods, 55 per cent. The number of methods tried is, of course, [illegible] but pneumonia, pleurisy, or some other complication was more [illegible] a fatal [illegible].

In the second place, the blood has been examined from the point of view of bacteriaemia. In the cultures the white cells should [illegible] 2,000, and the polymorphs should not exceed 90 per cent. [illegible] while in the severe forms the leucocytes [illegible] 30,000, the polymorphs reached 95 per cent. of the white, and there was a marked disappearance of the eosinophiles.

Such *complications* as endocarditis, pericarditis, [illegible] were the very severe cases, where even the best opsonic [illegible] failed. The [illegible] other signs.

For antitoxins are among *in the* [illegible] cases, when the [illegible] and diffusive. [illegible] and then, when [illegible] symptoms are marked. [illegible] contrast [illegible] cases with a large [illegible] and offensive discharge or a local swelling, are much [illegible].

The Results of Treatment. These would appear to be mainly a matter of recognizing the type of infection and applying thereto the appropriate treatment. The authorities of diagnosis are numerous; for instance, there is no doubt that operative procedures offer the best chances in cases of thyroid epidemics, yet unfortunately it is not always possible to distinguish these cases from the true septicaemias [illegible], the two frequently coexist.

We shall, now, consider the figures given by different authorities for the various forms of treatment.

For constitutional treatment, where domestic, drugs, and local applications are used according to the clinical manifestations, there is wide variation in mortality, depending on the observer.

MORTALITY IN CASES TREATED BY ORDINARY METHODS.

Various Cases	[illegible]
Wilson (41 cases)	[illegible]
Wilson (Pneumonia)	87.5
Lancashire Throat Hospital	42
[illegible]	30
Stevens' Memorial Hospital (Pneumonia cases)	19.7

Stevens' included all cases admitted, and it is not stated whether [illegible] were fixed or not. Great variation exists in deciding what

constitutes a puerperal infection. Bonney places the figure at 10 per cent if all puerperal infections are included.

Vaccines have recently been extensively used in this country and in America. The largest series was treated at the London Hospital, and published by Western.[illegible] He claims that it is possible to reduce the mortality by half by using autogenous vaccines. Thus, in 56 cases treated with vaccines the mortality was 32 per cent.; in 44 treated without vaccines, it was 55 per cent. Still more striking are the figures in those cases where there were organisms present in the blood at the time of delivery; in bacteriaemias treated without vaccines, the mortality was 87.5 per cent.; in those treated with vaccines it was 32 per cent. Western, however, was of opinion that vaccines were not indicated in the severe type of cases in which death usually occurred within twenty-four hours of the onset. He also found that vaccines unsatisfactory. Pohl[illegible] using polyvalent vaccines, had only 6 deaths in 28 cases of streptococcal bacteriaemia (i.e. 21.4 per cent.), and in 12 staphylococcal infections only 1 died, a mortality of 8.3 per cent.

Bacteriophages and antipuerperal sera have not received an extensive trial. They do not appear to have been very successful. Johnstone says he has seen no benefit from their use. Jardine used polyvalent sera in 25 cases with benefit in only 2. Bonsdorff, however, believes they have been of much service in a series of 26 cases in which he employed them.

Injections of a 2 per cent. sterile solution of magnesium sulphate have recently been used. In this way James A. Harris[illegible] treated 14 cases of severe septicaemia; in 5 cases streptococci were isolated from the blood, with 1 death; while in the other 9 cases streptococci were cultured from the uterus, and again 1 died. He finds this method useless in thrombophlebitis, pus collections, and chronic pyemias. To obtain good results the treatment must be undertaken early.

The operative treatment of thrombophlebitis still shows a very high mortality. Jeanne, Vanverts, and Pancot[illegible] collected 82 cases up to 1912 with a mortality of 59.8 per cent. But it must be remembered that this list includes some of the first operations, and also many hopeless cases. Thus, in some cases there was thrombosis of pelvic and uterine veins of both sides, of femoral, and even of the hypogastric veins. The cases operated upon within the last year or two would show more favourable results. On the other hand, it appears that thrombosis of the veins is found in the majority of puerperal infections, and in less than one third it constitutes the only lesion; of these latter it appears that the thrombosed vessel is capable of satisfactory surgical treatment in 79 per cent.

[illegible] *Journal*, 1912, [illegible] *Obst. and Gyn.*, 1912, [illegible] *Proceedings of the Royal Society of Medicine*, 1914, [illegible] *Obst. and Gyn.*, 1913, Mead, [illegible] *Med. Times*, 1911, [illegible] *Obst. and Gyn.*, 1912, [illegible] *Memoirs of Gynæcology*, [illegible] *Obst.*, 1913, [illegible] *Obst. and Gyn.*, 1912, [illegible]

Braxton Gladstone.

PULMONARY TUBERCULOSIS. — The prognosis in pulmonary tuberculosis in an individual case is extremely difficult, so much so that it has been said that he who attempts it can be sure of one thing only, and that is that he will be mistaken. Patients who appear to be doing well, and in whom the disease seems to be almost arrested, may, and often do, suffer a relapse brought about by fatigue, intercurrent illness, or other cause, or may die from hæmoptysis, meningitis, or pneumothorax. For example, a doctor who had recovered from an acute attack of the disease, who had doubled his weight, and was capable of walking fifteen miles with no rise of temperature, as the result of sanatorium treatment, suffered a severe relapse owing to an afternoon's enthusiastic tobogganning. This laid him up in bed for three months, and rendered him a more or less permanent invalid during the remainder of his life.

On the other hand, every physician of wide experience in this disease comes across numerous instances of patients whose life at some time or other has not appeared likely to be prolonged for more than a few months, and who nevertheless make a surprisingly good recovery. Three examples from my own experience may be given.

A Frenchman living in New York, who was apparently dying, was anxious to go to Paris to take farewell of his family, and consulted a number of physicians on the subject. All except one thought he would die on the voyage, and advised him not to undertake it. He, however, went to Paris, taking a coffin with him on the voyage. He improved somewhat, and then went to a well-known sanatorium, where he became so much better that he was able to take up his work again. He lived an adventurous life in all climates, and often faced conditions which would have tried a strong, healthy man. When he consulted me some fifteen years later, there was no active disease, but much fibrosis, some dry excavation, together with shortness of breath. He died two years afterwards from profuse hæmoptysis.

A working man came to my out-patient room at the Brompton Hospital, apparently in the last stages of the disease. Both lungs were extensively infiltrated, with signs of excavation in three lobes. A large laryngeal ulcer was present, and the temperature was 103°. The man refused to go to an infirmary, and it was impossible to get a bed for him in a home for the dying. A philanthropic lady gave the necessary funds for him to be boarded out in the country. He had practically no medical treatment, but when I saw him a year later all signs of active disease had gone, satisfactory fibrosis had taken place, the laryngeal ulcer was completely healed, and his general condition was so satisfactory that he was sent to the Frimley Sanatorium, where he reached the highest grade of labour. He continued well for some years, although he never returned to his occupation, continuing to live on the charity of the lady who had befriended him when he was thought to be dying.

A doctor who had just qualified was found to be in an early stage of the disease, and led an open-air life for two or more years. When

[illegible]

[illegible] In fact, pathological investigation of the disease [illegible] demonstrate the curability of the disease. It shows that many persons contract consumption and yet recover without their condition being discovered. [illegible] a number of persons have the disease in some slight form [illegible] a complete restoration to health. In fact, it is probable that at least 20 per cent of the cases of pulmonary tuberculosis in which a clinical diagnosis is [illegible] made, end in recovery, whatever the treatment and sometimes in [illegible] of treatment. In other instances the disease has obtained a firmer hold and more prolonged and [illegible] treatment is required to enable the defensive forces of the body to gain the victory; and in yet other cases, some of them diagnosed in the early stages, no form of treatment appears to have much, if any, effect in arresting the activity or the progress of the disease.

These differences are due to the fact that in this, as in every type of infective disease, we have a constant war between the invading micro-organisms and what may be termed comprehensively the defensive forces of the body. The latter are complicated [illegible] and upon their response to the invading organisms [illegible] depends the question of recovery or of extension of the disease and eventual death. The questions of recovery, partial recovery, and arrest, or gradual extension of the tuberculous process, depend upon the [illegible] of the virulence of the bacilli and the [illegible] resistance of the defensive forces of the body under the particular conditions of the individual case. If there is no response on the part of the defensive forces, or if the response is such that the toxic effect of the bacilli or their products is not neutralised, the inflammatory process advances and the disease extends.

In prognosis, therefore, we are faced with the problem: How will the defensive forces respond to the attack? If the individual's vitality [illegible] is undiminished, the outlook, even with opportunities for satisfactory methods of treatment, commenced at

Factors Influencing the Prognosis.

very good resistance, and but little is required to make the defensive forces victorious. Thus a working man who has continued his work under bad conditions whilst the disease has steadily shown but considerable progress, and until he is forced to give it up, will often do well when placed under more helpful conditions.

The duration of the attack, apart from the extent of the disease already present, has its effect on the prognosis. When the first symptom is haemoptysis, patients often do very well. [illegible] but that this symptom alarms the patient, and he presents himself for treatment at a time when there is only a slight amount of infiltration. When in this disease is [illegible] and efficient treatment is commenced at once, the outlook is usually favourable.

Family characteristics have some bearing on the prognosis. [illegible] have died from the disease, [illegible] having been unable to find [illegible] between [illegible] among the family in [illegible] of [illegible] the disease, the outlook is not so satisfactory.

Apart from the above characteristics, the most important factors are [illegible] of the patient in his facilities for treatment, and the conditions he has to face after the disease has become arrested.

[illegible] depends on the *character of the patient*. This has been expressed some time by the statement that as the disease it is [illegible] to [illegible] patient must depend on himself [illegible] direct him, but he must be prepared to devote himself wholeheartedly to the details of treatment until the arrest of the disease has continued for at least two years after the resumption of work. His chance of permanent recovery is small.

The question of *facilities for treatment* speaks for itself: the value of different forms of treatment is discussed later.

The [illegible] are important. It is often said that treatment of this disease is a failure, because so many relapses take place after it appears to have been arrested. It often breaks out, by [illegible] [illegible] but it [illegible] treated by proper treatment, and subsequently [illegible] it down by some more [illegible], all change [illegible] it is no reflection on the treatment given. If a man owing to bad conditions has his defences so undermined that he contracts tuberculosis, it is no reflection on satisfactory treatment if, after the disease has been once arrested, he suffers from a relapse as the direct result of returning to precisely the same conditions as those under which the disease originated. The essential things in the after-conditions are the avoidance of fatigue, the avoidance of hurrying rather than the necessity of [illegible] a [illegible] of [illegible] conditions, and the opportunity of being [illegible] during [illegible], so [illegible] symptoms of renewed activity of the disease occur. [illegible] is the usual cause of relapse, and in many instances it is [illegible] in the [illegible] [illegible] sport.

In concluding this part of the subject, we may say that if the disease is [illegible] and no response is made, death may take place in three months,

[illegible]

[illegible] and a condition delayed [illegible] beyond two years. If we consider the cases which end fatally in the [illegible] hospitals and most of these cases are pneumonic of the [illegible] type, the majority, to the extent of 80 per cent, have a duration of less than three [illegible] and only about 6 per cent have a duration of more than [illegible].

This type of the disease may be recognized by certain general signs. There are an index to the extent of the disease. So long as it [illegible] continues the disease is active. If [illegible] reduced by [illegible] and [illegible] for some months the outlook is always [illegible]. Again, in doubtful diagnosis of [illegible] disease, [illegible] present or [illegible] the case [illegible] unfavourable one. In such [illegible] the prognosis [illegible] the affected lung is [illegible] [illegible] by other organs, there [illegible] a bad [illegible] [illegible] accompanying [illegible] the [illegible] of [illegible] [illegible] to [illegible] and [illegible] certain number of [illegible] [illegible] [illegible] period.

The [illegible] temperature [illegible] according to the activity of the [illegible] and [illegible] rapid pulse rate, or [illegible] [illegible] [illegible]

[illegible] per cent. capable of full work at the end of three years. Whereas of [illegible] patients treated at the [illegible] Sanatorium [illegible] per cent. were capable of full work at the end of three years.

When the response to [illegible] and [illegible] are satisfactory, the prognosis [illegible] may be [illegible].

Finally, it may be said that when a patient who has suffered from [illegible] tuberculosis feels well, [illegible] gains weight, [illegible] has a normal temperature, [illegible] would [illegible] return or increase of expectoration [illegible] what [illegible] may be present. Conversely, a [illegible] raised temperature, [illegible] loss of weight, and a return or increase of expectoration [illegible] indicates the presence of [illegible] return of the activity of the disease.

Hygienic treatment has [illegible] on the failure of the large proportion of consumptives. As they [illegible] on their [illegible] the [illegible] good hygienic conditions [illegible] sufficient food. The most important thing in the treatment is the regulation of the amount of exercise in such a way that the [illegible] products of [illegible] the defensive forces of the body [illegible] paralyze them. This is the principle underlying sanatorium treatment. The figures given below suggest that climatic [illegible] have been overrated in the past; that good results are obtained from sanatorium treatment, and that these are somewhat improved by the [illegible] use of tuberculin. In a certain number of carefully selected cases partial or complete compression of a lung by nitrogen (artificial pneumothorax) gives good results.

Effects of Climate. We have conclusive evidence that pulmonary tuberculosis is capable of undergoing complete arrest in practically any kind of climate. Thus good results have been obtained in Russia below sea level and in low-lying Holland. Conversely, the death rate from this disease among Red Indians in the Rocky Mountains—one of [illegible] climates in the world—is stated to be 25 per cent. of the total mortality. This is doubtless due to the conditions under which the Indians live, and emphasizes the importance of the immediate environment. The theory that treatment at high altitudes is far superior to all other climatic or hygienic forms of treatment is not supported by modern observations. Perhaps the most important evidence in this respect is that of Professor Sonnmann, who has contrasted the results obtained by him at the Vejlefjord sanatorium, in Denmark, with those obtained by Turban at Davos. The Vejlefjord sanatorium is a few feet above the sea. Davos has an altitude of 5000 feet. At the Danish sanatorium the average stay of patients was 176 days, whereas at Davos it was 222 days. Again, Turban's patients were drawn from a richer class, who would be in a better position to look after themselves when they had left the sanatorium. In spite of these disadvantages, the results obtained by Professor

Sanatoria [illegible] favourably with those obtained by Trudeau and Cotton, considering that though at least as much attention to the successful treatment of consumption.

Climate, undoubtedly, cannot be ignored. Many better results are obtained in cool or temperate climates than in hot or tropical ones. Among [illegible] are not so good in situations which are damp or windswept and exposed to inclemency, or more protected situations. A change of climate is [illegible] to the consumptive in [illegible] but not essential. In suitable cases, an after-cure at an altitude is of service in expanding the lungs.

Percentage of Patients Free from Expectoration of Tubercle Bacilli Disappeared during Treatment.

Stage	[illegible]	[illegible]
I	54	79
II	41	65
III	11	17

Percentage of Patients who Suffered from Fever on Admission but became Afebrile during Treatment.

Stage	[illegible]	[illegible]
I	85	83
II	80	76
III	44	69

Particulars of After-history of Patients in whose Expectoration Tubercle Bacilli were Present during Stay at Sanatorium.

	I		II		III	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Able to work	94·7	91·1	54·0	71·3	16·8	24·7
Unable to work on account of tubercle	5·3	—	13·7	2·0	7·9	5·3
Dead from tubercle		8·9	29·6	25·7	72·2	67·3
[illegible]			2·7	1·0	[illegible]	1·2

PARTICULARS OF AFTER-HISTORY OF PATIENTS WHO WERE ADMITTED TO SANATORIUM WITH TB.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Alive [illegible]	90	100	41.4	77.1	42.5	29.5
Under treatment or [illegible]			11.4		7.4	3.9
Dead [illegible]	7		7.8	22.9	17.7	15.6
Unknown	3		3.3		2.5	0.5

In the later stages, life is probably prolonged if the patient is able to avoid marked climatic changes and to reside at some place where the conditions are suitable for the particular indications of the case.

The Results of Sanatorium Treatment. The results obtained by treatment at a sanatorium vary, as might be anticipated, according to the condition of the patient and the character of the lesion at the time treatment is commenced. The results obtained when treatment is commenced in what is known as Turban's Stage I are far better and more lasting than those obtained when treatment is commenced in Stage III. Further, the results are more lasting according to the class from which the patient is drawn and according to the character of his work and surroundings. In the case of the working classes about 50 to 60 per cent of those treated in Stage I may be expected to be capable of work five years after their discharge from the institution, whilst in those belonging to the upper classes, the percentage given by some authorities is as much as 80 to 90.

It is unwise to rely too much on statistical proof under present conditions, for it is difficult to compare data from different institutions, owing to the different methods adopted in classification and treatment. For example, in some institutions a proportion of patients receive tuberculin, in others, this remedy is not used. Certain broad conclusions, however, may be drawn, and the statistics of the results of sanatorium treatment given below are useful for that purpose. These are largely taken from the excellent chapter on this subject in Sir R. Douglas Powell and Dr. Hartley's book on *Diseases of the Lungs and Pleura*.

I.—Showing Results of Sanatorium Treatment in 267 Cases of Early Pulmonary Tuberculosis (Stage I. T. [illegible]) Admitted to the Scandole Sanatorium [illegible] Years 1900–1908.

1900–1901	14	14	7		2	5		[illegible]
1901–1902	26	25	8	1	10	4	1	[illegible]
1902–1903	26	21	7	1	[illegible]	2	1	[illegible]
1903–1904	33	28	18	1	6	8	1	[illegible]
1904–1905	35	30	16	4	11	4	2	[illegible]
1905–1906	37	35	17	4	7	7	1	[illegible]
1906–1907	51	42	29	5	3	12		[illegible]
1907–1908	31	13	34	15	1		1	[illegible]
Totals	267	239	136	[illegible]	36	50	7	[illegible]

II. Showing Results of Sanatorium Treatment in 317 Cases of Advanced Pulmonary Tuberculosis (Stage III. T. [illegible]) Admitted to the Scandole Sanatorium [illegible] Years 1900–1908.

1900–1901	12	7			12			[illegible]
1901–1902	20	8	2		17	1		[illegible]
1902–1903	31	17	2		26	[illegible]	1	[illegible]
1903–1904	29	11	3		26			[illegible]
1904–1905	37	19	6	1	25	[illegible]	2	[illegible]
1905–1906	68	25	7	8	46	[illegible]	4	[illegible]
1906–1907	62	23	10	9	41	2	3	[illegible]
1907–1908	58	24	14	32	12			[illegible]
Totals	317	130	44	50	207	[illegible]	3	[illegible]

These statistics of Dr. John Gray, which are confirmed and improved upon by other English observers such as Dr. Burton Fanning, show the capacity for work at varying intervals. They also show that of

[illegible] 267 patients, [illegible] in [illegible] 50 years [illegible] 1904 to 1908 [illegible] 117 patients [illegible] 267 were [illegible] to be alive.

[illegible] cases of the German State Sanatoria, although not strictly comparable [illegible] to all cases of cured cases show that 41 per cent of the male and 37 per cent of the female patients were capable of full [illegible] to have [illegible] after their discharge from the institution.

(III) Showing the Immediate and Ultimate Results in Male Patients Treated in German Sanatoria under the Provisions of the Invalidity Insurance Law during the Years 1904 to 1908.

			1904	1905	1906	1907	1908
1904	16,957	79	73	61	52	48	44
1905	19,685	81		76	66	54	49
1906	21,020	82			77	65	55
1907	22,238	81				77	65
1908	20,147	84					77

(III) Showing the Immediate and Ultimate Results in Female Patients Treated in German Sanatoria under the Provisions of the Invalidity Insurance Law during the Years 1904 to 1908.

			1904	1905	1906	1907	1908
1904	6,329	81	76	66	59	55	51
1905	7,536	83		78	67	60	55
1906	9,063	85			81	70	63
1907	9,816	84				80	69
1908	12,288	86					82

Slightly better results have been obtained in other German sanatoria. Thus, in the case of the Prussian and Hessian Railway Company employes, 60 per cent were capable of full work five years after leaving the sanatorium, although a considerable proportion of the cases (26 per cent in 1908) were in Turban's Stage III.

IV.—Showing the Immediate and After-Results of Sanatorium Treatment among the Employés of the Prussian and Hessian Railway Companies during the Years 1904 to 1908.

[illegible]	[illegible]	1904	1905	1906	1907	1908
1904	[illegible]	85.7	[illegible]	[illegible]	[illegible]	[illegible]
1905	810		80.3	[illegible]	[illegible]	68.4
1906	1,180			80.5	[illegible]	[illegible]
1907	[illegible]				81.0	[illegible]
1908	1,142					82.[illegible]

[illegible] … the results of sanatorium treatment show that in the early cases a large percentage are capable … as shown by the … and confirm the observation that treatment in the later stages is seldom … satisfactory result for any length of time.

Dr. Noel Bardswell has given the results obtained in the case of patients treated by him at the Mundesley Sanatorium from 1901 to 1905, as observed to the year 1909.

V.—Showing Results obtained in 241 Male and Female Patients belonging to the Upper Classes treated at the Mundesley Sanatorium, Norfolk, during the Five Years 1901 to 1905.

All Cases considered together.

[illegible]	[illegible]	1902	1903	1904	1905	1906	1907	1908	1909				
[illegible]	58	49	39	33	27	26	24	22	20	Well	99	41.0%	47.2
[illegible]	53	—	48	39	36	32	31	30	26	Ailing	15	6.2	
[illegible]	55	2		52	43	39	35	34	32	Dead	101	41.9%	
[illegible]	34				36	31	29	29	28	Dead or unable to work			49.9
[illegible]	15					13	12	9	8		19	8.0%	
	215*									Lost sight of		7 (3.0%)	

Total 241

Incipient Cases.

1901	10	25	10	10	10	9	9	8	7	6	Wom[illegible]	16·7 (4·0)	[illegible]
1902	15			15	14	14	14	10	13	12	Men	1 (1·6)	
1903	18	[illegible]			18	16	16	15	15	15	Total [illegible]		
1904	11					11	11	11	11	11	[illegible]	71 17·6	
1905	4						3	3	[illegible]	[illegible]	[illegible]		
	58										Lost [illegible]		
											[illegible]	4 6·4	
											Total [illegible] 62		
[illegible]	[illegible]			[illegible]		[illegible]							[illegible]
[illegible]	[illegible]			[illegible]		[illegible]							

Moderately Advanced Cases.

1901	24	[illegible]	24	17	15	12	11	11	[illegible]	11	Wom[illegible]	47 49·4	[illegible]
1902	19			19	16	15	14	14	[illegible]	12	Men	10 10·5	
1903	25				24	21	[illegible]	[illegible]	16	15	Total [illegible]		
1904	16					16	[illegible]	15	15	14	[illegible]	95 68·8	
1905	7					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
	91										Lost sight [illegible]		
											[illegible]	3 3·1	
											Total [illegible] 95		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]							[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]							

Far-advanced Cases.

1901	24	16	12	8	6	6	5	4	3	Wom[illegible]	67 71	[illegible]
1902	19		12	9	6	4	4	4	2	Men	14 17	
1903	12			10	6	4	4	[illegible]	2	Total [illegible]		
1904	7				6	4	3	3	3	[illegible]	74 88·0	
1905	4					2	2	1		[illegible]		
	66									Lost sight [illegible]		
										[illegible]	0	
										Total [illegible] 84		

[illegible]

Careful observations in the same direction have been made by Dr. Lawrason Brown and the late Mr. E. G. Pope on the results obtained in 2222 patients admitted in all stages of the disease, who were treated at the Adirondack Cottage Sanatorium in New York State. The immediate results gave a percentage of 56 apparently cured and 32 improved out of 620 early cases.

VI.—Showing the Condition on Discharge of 2222 Patients Admitted to the Adirondack Cottage Sanatorium, New York State, U.S.A.

Incipient cases	620	56	32	11	0·00
Moderately advanced	1329	12	46	40	2·00
Far advanced	273	6	16	78	1·00

The *after-results* of these cases, calculated in terms of 1000, showed:

1. That 750 patients out of 1000 discharged as apparently cured survived at the end of 15 years, as against 850 out of 1000 of the general population.

2. That the expectancy of life in those discharged with arrested disease (which includes 32 per cent of the incipient cases, 46 per cent of the moderately advanced, and 16 per cent of far advanced) was between seven and eight years.

Results of Tuberculin Treatment.—It is difficult to prove by any evidence other than the personal supervision of a large series of cases that tuberculin is of the value in pulmonary tuberculosis that most authorities on this disease consider it. Statistics are open to many objections when used for such a purpose; but it is recognized—much more strongly by physicians in Germany, Switzerland, and America than by most physicians in England, it is fair to add—that tuberculin has considerable value both as regards the immediate and ultimate results of treatment. If this were not so, the great extension in the use of this remedy seen both in Germany and England would be inexplicable; for example, in 1905 tuberculin was employed in 40 out of 123 private and public sanatoria in Germany; in 1906, in 42 out of 132; and in 1907, in 77 out of 135. In three years, then, its employment rose from 29 to 57 per cent. To my mind, the best summing up on this subject is that of Dr. Lawrason Brown, who says, "Tuberculin when properly given does no harm, may produce no apparent effect, and may markedly benefit an individual patient who can follow at the same time the hygienic-dietetic treatment while in a health

present at home, at rest, or at work. Some patients, even in advanced stages, reap great benefit. The immediate and ultimate results are improved, fewer relapses occur, and more patients lose the tubercle bacilli in their sputum. My own experience is to the effect that patients suffering from consumption, and in whom there are accompanying complications, against the use of tuberculin, not only lose their bacilli in greater numbers when tuberculin is *[illegible]* than patients who do not have this remedy, but suffer from relapses less frequently.

Statistics on such a subject tend to be fallacious, but a few may be given to support the above generalizations. The problem may be discussed from numerous effective, the three following points of view: (1) The disappearance of tubercle bacilli from the expectoration; (2) The immediate results of treatment from a clinical standpoint; (3) The ultimate results.

1. *The Disappearance of Tubercle Bacilli.*—Dr. Radeliff, of the King Edward VII Sanatorium, found that in patients treated by sanatorium methods and no tuberculin, the percentage of cases in which the bacilli disappeared was as follows: Stage I, 45·6 per cent; Stage II, 19 per cent; Stage III, 8·9 per cent; or taking all cases together, 25·1 per cent. Loewenstein, on the other hand, using a more searching technique, found that in patients treated by sanatorium methods and tuberculin, the percentage of cases in which the bacilli disappeared was as high as 52·9 per cent. Bandelier, in a similar series, found the percentage to be: Stage I, 100 per cent; Stage II, 87·3 per cent; Stage III, 44·2 per cent. Curschmann gives: Stage I, 80 per cent; Stage II, 47·7 per cent; Stage III, 33·7 per cent.

We may say, then, that so far as statistics go, there is evidence of the value of tuberculin in causing the disappearance of tubercle bacilli in all stages; and that when we take all cases in one group, we find that with sanatorium methods alone less than 25 per cent of the patients lose the bacilli from their expectoration, but that when tuberculin is added to the treatment, the percentage is over 50.

2. *The Immediate Results of Treatment from a Clinical Standpoint.*—Trudeau found that in the incipient cases the results were very satisfactory with sanatorium methods alone, and that they were but slightly enhanced by the use of tuberculin. In the moderately advanced cases, 27 per cent of those in whose treatment tuberculin was given were cured, as against 6 per cent where tuberculin was not given; 55 per cent were arrested when tuberculin was given, as against 51 per cent when it was not; whilst 18 per cent remained active when tuberculin was given, as against 43 per cent when it was not.

3. *The Ultimate Results.*—Turban found that of 86 patients whose sputum contained bacilli and who were treated with tuberculin, 52·3 per cent are capable of work from one to seven years after their discharge from the sanatorium; whereas, of 241 patients whose sputum also contained bacilli and to whom no tuberculin was given, only 39·4 per cent gave a similar result. Ritter found that the following

percentage of his patients were capable of work one to four years after their discharge from his sanatorium. 150 being examined only about one year after their discharge.

PATIENTS CAPABLE OF WORK ONE TO FOUR YEARS AFTER DISCHARGE FROM SANATORIUM (RIEGEL).

Stage I	Cured with tubercle bacilli	[illegible]	[illegible]	72 per cent
II		82	[illegible]	[illegible]
III		30	[illegible]	22

Leyden's Brown's statistics show an advantage in favour of tuberculin, but to a smaller extent. 101 his moderately advanced cases treated with tuberculin, however, 41 per cent were alive of those treated with tuberculin six to fifteen years afterwards, as against 22 per cent of those not so treated.

Results of Compressing a Lung by Nitrogen Gas (Artificial Pneumothorax). It has been found that in cases in which one lung is comparatively sound but no real progress is being made towards the healing of the affected lung, compression for many months of the sound lung gives good results. In many cases compression is either limited in extent or impossible to procure owing to the presence of adhesions. In all cases the main factor in the results obtained by this special form of treatment is the selection of the case. Various authors put the percentage of cases suitable for treatment at about 5. Nottingham selected 100 cases for treatment but found to produce collapse in 46 of these owing to the presence of adhesions. Both groups were given sanatorium treatment and were followed up for between one and three-quarter and six years. The results obtained were as follows:

RESULTS OF TREATMENT BY ARTIFICIAL PNEUMOTHORAX (NOTTINGHAM).

All able to work	30	22.4
Free from tubercle bacilli	50	8.4
Dead from tuberculosis	18.7	38.8

Other observers give somewhat similar figures. Carpi (1914), in treating on 36 cases, found that 6, all of which but one were bad cavity cases, were cured. Shortle (1916) had 104 cases, in 79 of which he induced compression; of the inoperable cases, only 2 (8 per cent) were working at the time of the report, and only 1 (4 per cent) was improved; of the patients in whom compression was produced, 22 (28 per cent) were working, and 19 (25 per cent) were in a good condition of health.

Other Lesions.

PULSE, IRREGULARITIES OF THE. [illegible]

Sinus Irregularity. [illegible]

The Extrasystolic Type of Arrhythmia. Of this condition almost the same must be said. Premature contractions, whether arising in [illegible] of functional lesions are due in some cases to the development of hypersensitive foci in the myocardium, in others to extracardiac influences. But not even in the first kind of case does the extrasystole count for much. As Sir James Mackenzie puts it, [illegible] in clinical practice the extrasystole is of no more importance than

Tachycardia. This is the next kind of irregularity to be considered. Here it is first necessary to discriminate between quickening of the pulse by cardiac causes and that due to extracardiac influences. In cardiac of the former class, such as those of exophthalmic goitre, and the

[illegible]

[illegible]

[illegible]

Auricular Flutter. [illegible]

Totally Irregular Pulse. Auricular Fibrillation. [illegible]

permanent sooner or later. Ninety-nine times out of a hundred, then (for it seems that there are rare exceptions), total arrhythmia spells grave organic disease.

The next question to be answered is the expectation of life after this disturbance has appeared. As to this, there is a difficulty which may be best illustrated by contrasting two cases recently under the writer's observation. At one end of the scale was the case of an elderly man with cardiosclerotic and alcoholic degeneration of the myocardium, who died only twelve days after the pulse had become totally irregular. At the other end comes a man with mitral stenosis whose pulse was found to be quite irregular over four years ago; yet this has not prevented him from keeping on at his rather laborious work in a tan-yard, practically without intermission, since that time. The explanation of this discrepancy is to be found in the fact that the ventricle, and not the auricle, is the vital part of the heart. The danger of the totally irregular pulse is probably twofold: in the first place, the rapid irregular stream of stimuli pouring down on the ventricle from the auricle imposes a great strain on the former; and secondly, if the auricle is out of action, this adds somewhat to that venous stasis which does so profound an injury to the nutrition of the myocardium (among other tissues), and thus assists materially in precipitating cardiac downfall. It is the first of these factors that is the more immediately dangerous; and in any case it is the condition of the ventricular wall on which depends the ultimate fate of the heart, as to whether it shall continue to work effectively or not. The two cases mentioned above bring out this point very strongly: in the first, alcohol and senility had already reduced the ventricular myocardium to the verge of bankruptcy, so that the onset of an irregular pulse proved to be the last straw. In the other, the active phase of the rheumatic infection was long past, and, as is often the case under such circumstances, the ventricle was almost well again, so that it was able to carry on the circulation, though exposed to the additional worry of a rapid and disorderly series of stimuli descending on it from above.

It is the paramount importance of the ventricle that explains the contrast between the behaviour of the cardiosclerotic and the post-rheumatic heart respectively, after total arrhythmia has supervened. In the first of these, the arterial degeneration that has undermined the efficiency of the auricular wall has been equally active in its attack on the ventricular myocardium; so that when the stage is reached at which the auricular rhythm goes wrong and thus imposes an extra strain on the ventricle, that structure is already barely able to cope with the demands made upon it by the ordinary rate and rhythm of stimulation. In the post-rheumatic type of heart disease, on the other hand, the degenerative changes induced in the cardiac wall by overwork and chronic stasis proceed more quickly in the auricles than in the ventricles, because in every such case there is mitral obstruction, which throws the burden of overstress upon the

auricular wall. As a result, the auricle breaks down and fibrillates, while the ventricle still has plenty of work left in it. Consequently the new burden thrown upon it, by the disorderly behaviour of the auricle fails to overwhelm it. The dominant importance of ventricular integrity explains the different way in which some cases of mitral stenosis respond to the onset of auricular fibrillation and the total arrhythmia dependent thereon. In some, the rheumatic process that established the valvular deformity, at the same time injured the ventricular myocardium and induced dilatation: for various reasons this is more persistent in some cases than in others, and it is in such that the supervention of the totally irregular rhythm produces the most definite effects so far as this type of cardiac disease is concerned.

So far, then, our conclusion is that in any given case exhibiting the total arrhythmia of auricular fibrillation, the outlook turns on the condition of the ventricle. It remains to translate this into clinical terminology. First, the prognosis is generally better if the underlying disease be post-rheumatic than if it be cardiosclerotic, alcoholic, or syphilitic in origin. Second, bad signs are œdema, anginal pain, and grouped respirations. The more pronounced and easily provoked the dyspnœa, the worse the prognosis. Finally, the extent to which the symptoms improve under the influence of rest and digitalis, measures which meet with quite a remarkable response in some cases and none at all in others, is an important index of probabilities. The pulse should become slower, the output of urine should increase, and the subjective symptoms should be definitely mitigated, within a few days—a week at the outside—of the institution of such treatment. If this improvement is not manifest, it means that the patient is incapable of receiving benefit from any form of help: and the gravity of the prognosis is directly proportional to this insensibility to appropriate therapeutics.

To sum up: the appearance of total arrhythmia in any case of heart disease adds to the gravity of the prognosis. In any given case the future depends upon the efficiency or otherwise of the ventricle, and on the response to treatment.

Heart-block.—Here the prognosis is necessarily grave. This is not to say that it is an irrecoverable phase of heart disease. In many cases of extreme heart-block the unexpected has happened: the normal rhythm has been restored; but the general rule is that heart-block depends on gross organic disease involving central and vital portions of the myocardium.

The risk of sudden asystole is considerable where there are the syncopal or epileptiform attacks which, when they coincide with the prolonged pauses of heart-block, constitute the Stokes-Adams syndrome. Patients who suffer in this way may go out quite abruptly, being found dead in bed or the like; or they may be quickly exhausted by a prolonged series of such attacks occurring at brief intervals. In milder cases, where only every fourth, third, or even second beat drops out,

the prospect of sudden death from block and syncope is remote, provided the patient is willing and able to restrict his activities within the limits allowed him by his cardiac lesion.

In any individual case of heart-block, there are four considerations upon which the prognosis rests. The nature of the lesion causing the block is the first of these. Acute heart-block—i.e., injury to conductivity by an infective lesion of the myocardium—is usually slight and transitory; it does not appear greatly to pervert the course of the disease from that which it would have followed if no heart-block had occurred. In ulcerative endocarditis, however, the supervention of heart-block may be a serious feature; it may indicate direct extension of a burrowing ulceration into the auriculo-ventricular connections. Chronic heart-block is much more often encountered than that due to acute lesions. Its commonest causes are arteriosclerosis and syphilis. Of these two, the latter gives the best chance of recovery, since it is amenable to specific treatment. Even so, however, cure is only effected in a few cases. The arteriosclerotic cases tend to get worse, slowly as a rule, sometimes rapidly.

This introduces two other points of importance—the degree of block present, and the course which it follows under observation. It is pretty obvious that the advanced degrees of block are more to be feared than comparatively mild phases; but in estimating the bearing which the point has on the prognosis, it is essential to take into consideration the progress or otherwise of the interruption of conductivity. This is best illustrated by comparing two cases recently under the writer's care. The first patient was an old lady with pronounced arterial degeneration. Her illness began with occasional attacks of block; but within a week it was practically continuous, and in ten days from the onset she was dead. The other patient, an elderly man of placid temperament, gives a history of ten years' bradycardia and fainting attacks. He lives quietly, and though he has, for several years at least, been the subject of complete heart-block, he seems little the worse for it so long as he refrains from physical or mental stress. His cardiac symptoms have made no perceptible progress for years. This comparison affords a vivid illustration of the fact that a severe but stationary degree of block is less minatory than a mild but progressive case.

One more point will arise for consideration in any given case—the other signs of cardiac disease. So far as the likelihood of a fatal issue is concerned, a bad prognosis is of course inevitable when there are signs of impaired contractility in addition to the evidences of interrupted conduction; in such a case it is obvious that the block may be of minor importance, the outlook depending more directly on the state of the other myocardial functions. If, however, we are essaying a forecast of the course that the block itself will follow, then the general condition of the heart makes rather less difference, except that gross enfeeblement of contractile power tends to accelerate the destruction of the conducting function. As for the possibility of lessening block

by treatment, apart from the syphilitic type of case spoken of above; nothing has any direct effect as a rule.

Alternating Pulse.—One other aberration of the pulse is generally included in descriptions of arrhythmia, the alternating pulse. This term should include nothing except the alternation of weak and strong beats of the same length. When this is encountered, it is always a sign of advanced or advancing exhaustion of contractility *par excellence* the vital function of the myocardium. It is therefore an ominous feature of any case of heart disease. It is true that in some cases its first appearances are transitory; it may be detected during a bout of paroxysmal tachycardia, or for a few beats following an extrasystole; even so, it is to be received as a forewarning of further troubles to come, and even where it is unsupported by other evidence of myocardial deterioration, it forms sufficient reason, of itself, for warning the patient that his activities must be restricted in future.

Summary.—The aim of this article has been to show that in any case marked by irregularity of the pulse, this symptom should always be analyzed so that its exact mode of origin may be determined; and further, it should always be considered in conjunction with the other means of examining the heart. Nothing is more wildly inaccurate than prognosis founded on the degree of arrhythmia without scientific exploration of its origin.

Carey F. Coombs.

PURPURA.—Purpura is to be regarded as a symptom rather than a disease. It appears to depend upon a defect in the small vessels, probably the veins. In many instances it is a mere incident in the course of a disease, and such cases need not be discussed here.

The following special varieties may be recognized: (1) *P. simplex*; (2) *P. hæmorrhagica*; (3) *Schönlein's purpura* (peliosis rheumatica); (4) *Henoch's purpura.*

Statistics regarding cases of purpura give little help in regard to prognosis, since the severity of the different types varies greatly. It may be noted, however, that Mackenzie found the mortality in a series of 200 consecutive cases to be 14 per cent.

As a general statement, it may be said that the severity of purpura increases with advancing years. In purpuric subjects, attacks are liable to become more frequent, and the resulting anæmia is more severe.

1. Purpura Simplex.—This is a mild form usually seen in children. The hæmorrhages are seldom larger than petechiæ, and in most cases are confined to the limbs. Prognosis is favourable. Successive crops of spots may appear for three or four days, but as a rule the patient is well within a fortnight, although the pigmented spots may be seen for some weeks. The associated symptoms, such as fever or diarrhœa, never give rise to serious trouble.

In a few instances an attack of purpura simplex has been followed by symptoms of purpura hæmorrhagica.

Cases have been reported in which the purpuric spots were followed

by gangrene. Some of these are to be explained by the administration of salicylates or iodides. Apart from such causes they are extremely rare.

2. **Purpura Hæmorrhagica.**—This is the most formidable type of purpura. Prognosis may be the more serious from the fact that it usually affects children already in delicate health, although it also attacks adults. The purpuric spots appear and soon increase in number and in size.

Epistaxis, bleeding from the gums, hæmatemesis, hæmaturia, and, less commonly, hæmoptysis may occur. The patient becomes profoundly anæmic with great rapidity. In a week the corpuscles may have fallen to 50 per cent. Cases of *purpura fulminans*, occurring especially in children, may be fatal within twenty-four hours: in some of these the end comes before there has been any obvious bleeding from the mucous membranes.

Cerebral hæmorrhage, kidney disease, hæmorrhage into the suprarenals, and heart failure or exhaustion from repeated bleedings, may also lead to a fatal result.

In favourable cases, symptoms cease or lessen in from one to two weeks. There is always a prolonged period of convalescence. Patients are weak and emaciated, and several months may elapse before the blood regains its normal condition. While we must regard prognosis in purpura hæmorrhagica as somewhat grave, perhaps the most striking thing about it is the large proportion of very severe cases which recover.

The chief points on which we can base a prognosis are as follows: The more severe and frequent the cutaneous hæmorrhages, the more serious is the case. Hæmorrhages from the mucous membranes, if at all severe, add to the gravity of the condition; of these, epistaxis has probably the least serious significance. Hæmorrhage from many mucous membranes is more serious than from one. Marked pyrexia, albuminuria, constitutional disturbance, and mental depression are unfavourable signs. Accurate information regarding the effect and progress of the hæmorrhages is to be obtained by a frequent use of the hæmocytometer and hæmoglobinometer.

An intermediate group of cases is that in which special symptoms associated with the hæmorrhages arise. These include the occurrence of blebs, ulcers, or necrosis as the result of the cutaneous hæmorrhages; hæmorrhages into the tongue may give rise to great swelling and tension, and may even call for relief by incision; recurring epistaxis may persist after other symptoms have been arrested.

3. **Schonlein's Purpura (Peliosis Rheumatica).** This variety is associated with pain and swelling in the joints, urticarial and inflammatory lesions of the skin, and a variable degree of fever. The outcome is usually quite favourable. Fatal cases have occurred, but with great rarity. It is, however, associated with a very large number of possible complications, and recurrence of the disease is [illegible] common. The symptoms of an attack may be very persistent

recurring crops of petechiæ and attacks of fever and arthritis may persist for over a year.

A very potent factor in determining relapses is exertion, and it may be stated here that rest in bed is the one therapeutic measure of outstanding importance in all forms of purpura. Pharyngitis, sometimes so severe as to lead to gangrene of the tonsils and uvula, may occur. The other complications are those usually associated with rheumatism: endocarditis, pericarditis, pleurisy, albuminuria, chorea, and hyperpyrexia may supervene.

It should be remembered, however, that in spite of the somewhat formidable list of possible contingencies, their actual occurrence is so rare that peliosis rheumatica in the average case may be regarded as a benign affection.

4. **Henoch's Purpura.** This variety is associated with vomiting, colic, and diarrhœa. A considerable number of cases associated with intussusception are on record. There are joint swellings, and cutaneous affections such as erythema may accompany the purpura. Actual hæmorrhages from mucous membranes may occur.

Prognosis is fairly good, but a fatal outcome may take place. Osler recorded 3 deaths in a series of 11 cases. In one the fatal outcome was the result of an intense hæmorrhagic nephritis.

Hæmorrhage from mucous membranes, nephritis, and exhaustion are the chief dangers, in the absence of any association with a grave abdominal condition. When intussusception is present, it dominates the position as regards prognosis, but it is, of course, more dangerous because of the purpura.

Relapses are a common feature, and attacks of Henoch's purpura may recur for years.

G. L. Gulland.
A. Goodall.

PYELOCYSTITIS.—Pyelocystitis includes a number of conditions differing in gravity, and therefore varying in prognosis. The infection is most commonly due to the *B. coli communis*, which is usually present in pure culture.

B. coli pyelocystitis is acute or chronic; and it may be uncomplicated or complicated. In acute uncomplicated *B. coli* pyelocystitis the infection has occurred in a previously healthy urinary tract. The origin may be traced to hæmorrhoids, acute or chronic colitis, appendicitis, chronic constipation, dysentery, or some other intestinal trouble; or there may be no apparent cause. The attack may be moderate or severe. It is usually possible during the first two days to form an estimate of its probable severity.

In a moderate attack the temperature may rise to 101° or 102° and is ushered in by a slight shivering or a feeling of chilliness. The bladder symptoms may be severe and distressing. Kidney symptoms are less prominent, amounting to slight pain and tenderness but no enlargement of the organ; they may be entirely absent.

In a severe attack the initial rigor is also severe, and may be repeated; the temperature rises to 102° or 104°, or even to 105° F.

and the patient shows evidence of profound toxæmia. There is severe pain in the kidney, the abdominal muscles are rigid, the kidney region is tender, and the kidney, if it can be felt, is enlarged.

A mild attack such as has been sketched above may be expected to last for ten or fourteen days. There is no danger to life, and the principal points in the prognosis are: that relapses are very frequent if the patient is allowed to get up or to go out too soon; and that it is impossible to say, even in a mild attack of pyelocystitis, whether a bacilluria may not persist and give rise to future trouble.

In a severe attack there is danger to life. If the patient is old, or very stout, or bronchitic, or otherwise incapable of withstanding a severe toxæmia, he will probably succumb after a week or ten days. On the other hand, when the patient suffers from no such complication, the immediate prognosis is more favourable. The temperature remains high for about a week, but after that time should commence to fall, and at the end of ten or fourteen days from the onset of the illness will have reached normal. If the temperature remains high and the symptoms show no sign of abating at the end of a week, the outlook is less favourable, and will, if no improvement occurs in the next three or four days, become grave. After one or more of such relapses, the patient usually succumbs. Operation in such cases should not be too long delayed. If at the end of a week the acute symptoms persist, and the patient is beginning to lose ground, operation should be performed.

The results of nephrotomy are not very satisfactory. In 20 cases of nephrotomy for acute pyelonephritis there were 7 deaths (35 per cent). In surviving cases the late results are also unsatisfactory; the acute symptoms subside, but chronic pyelonephritis persists, and nephrectomy may be required at a later date.

The best results in acute cases have been obtained by nephrectomy, after ascertaining that the second kidney is healthy. In 17 cases of nephrectomy there were no deaths.

Where the acute symptoms subside without operation, the infection in some cases disappears. In a large number of cases, however, it persists in a mild form, the principal symptoms being those of slight chronic cystitis. In such cases there is a constant danger of recurrence, which takes place sometimes after short intervals, and sometimes after some years. Secondary stone-formation in the renal pelvis or in the bladder is not uncommon in such cases, and there is a danger of ascending pyelonephritis of the healthy kidney, leading to suppression of urine and death. Some cases go on for many years without any change, but the patient suffers chronic ill health, and is unfit for great or prolonged efforts, either physical or mental. In some of these cases the original focus of infection, such as chronic intestinal stasis, produces a chronic toxæmia, to which that from the kidney is added. In other cases the kidney is the principal or only source of the toxæmia. Nephrectomy is the only effective treatment in the latter class, and is frequently a difficult and dangerous operation.

In some cases of chronic pyelocystitis the principal focus of infection lies in the prostate. In such cases the symptoms are principally those of cystitis; the pyelitis passes off after a slight preliminary attack, or persists in a mild form. Recovery depends upon successful treatment of the chronic prostatitis. The prognosis for ultimate recovery is somewhat better in these cases, but in some the condition persists in spite of vigorous and prolonged treatment.

Chronic pyelocystitis may be complicated by stone in the kidney or bladder, by movable kidney, diverticulum of the bladder, stricture, or enlarged prostate, or by bladder growths. Prognosis in such cases depends upon the possibility of removal of the stone or other complicating disease. Until this is done the pyelocystitis cannot be cured.

Two special forms of *B. coli* pyelocystitis may be mentioned. The pyelitis of infancy and childhood is a frequent form. It occurs in infants a few months old and in young children, and takes an acute course. The condition occasionally ends fatally, but recovery takes place in the great majority of cases, even when a very high temperature is recorded, and profound toxæmia, even coma, is present. The cases improve rapidly under treatment; the temperature falls, and the symptoms subside in a week or ten days. The pus may remain for several weeks, and the bacteria for longer, but eventually these also disappear.

Pyelonephritis is a not infrequent complication of the early months of pregnancy, arising usually in a previously healthy urinary tract, but occasionally as an exacerbation of a chronic pyelocystitis. Premature labour occurs in 25 per cent of severe cases. When the acute attack occurs early in pregnancy, and there is an interval of normal temperature before parturition takes place, the puerperium is usually apyretic. If, however, the acute attack occurs late in pregnancy, there is usually fever during the puerperium; but puerperal infection does not occur.

If the pregnancy be interrupted, the child is usually ill-nourished, and dies in one-third of the cases. If the attack occur late, and the pregnancy go on to full term, the child is usually healthy and well nourished.

The production of abortion, or the induction of premature labour, is seldom necessary, but it may be called for in a severe case. After parturition, the pyelonephritis may subside, and the urine may clear and become sterile; but more frequently bacilluria and some degree of pyelonephritis persist, and exacerbation occurs during succeeding pregnancies.

J. W. Thomson Walker.

PYELONEPHRITIS.—(*See* PYELOCYSTITIS.)

PYLORUS, CONGENITAL STENOSIS OF (*see also* STOMACH, SURGICAL AFFECTIONS OF).—Though rather new to the profession, this disease is by no means a rarity. The large proportion of cases recognized in the first-born infants of medical men makes it probable that a

number of deaths occur in other children without a diagnosis. The hall-mark of the condition is the association of vomiting with constipation, palpable pyloric tumour, and visible gastric peristalsis. The symptoms usually come on at the age of about four weeks, and apart from treatment are fatal in a few weeks.

It is still hotly debated whether the treatment ought to be purely medical or purely surgical. Scudder, for instance, denies that any cures have ever been effected by medical means, and urges operation in every case.

Results of Medical Treatment.—Medical treatment includes lavage, careful feeding by the best modern methods (including citrated milk, peptonized milk, albumen-water, or breast milk, all in small quantities), and perhaps a little tincture of opium. There is no doubt that many cases have recovered under such treatment. The proportion varies in different statistics from 10 to 60 per cent: it is probably less than half the total number. Monier's figures give 80 to 90 per cent of fatalities under medical treatment. In some of the alleged medical cures the diagnosis has not been indisputably established.

In any individual case, the prognosis depends upon the following factors. Children of 8 lb. do better than those of 6 lb. Diarrhœa is very ominous. Head-retraction and fever may be seen just before death. Large vomits are apt to induce fatal collapse. If the weight continues to fall and the vomiting persists after two to three weeks of careful medical treatment, it is not likely that the child will live, apart from operation.

It must be remembered that the small intestine is thin and atrophic, and any attempt to 'feed up' the child, before or after operation, will probably induce fatal diarrhœa.

In favourable cases treatment takes six to twelve weeks. The tumour is probably permanent: in cases described by Batten and many others, the persistence of the hypertrophy was verified by autopsy long after more or less perfect cure of the symptoms.

There is some tendency to relapse in later life: Scudder quotes a number of authorities to this effect.

Results of Surgical Treatment.—From 1898 to 1905 the results of surgical treatment were not very good, but probably better than those obtained by medical means. According to Scudder, the mortality of operation was 46·5 per cent. Paterson in 1906 collected the records of 25 cases treated by gastrojejunostomy, of which 13 died of the operation, 3 died within two months, and 9 were cured. Pyloroplasty was more successful: of 9 recorded cases, 3 died of the operation, 1 died two months later of diarrhœa, and 5 were cured.

Since 1905, three short series have been published by Scudder showing much better results. These include, first, 10 cases operated on by several surgeons on the Pacific coast, and recorded by Stillman: second, a group of 9 in the practice of Richter, of Chicago; and third, Scudder's own series of 17 operations. These combined give a record of 36 cases, with only 5 deaths—that is, a mortality of 13·8 per cent.

These American cases were treated by gastrojejunostomy. Scudder's patients have been followed for periods varying from one to eight years (all over two years with a single exception). All but three were under eight weeks old at the time of the operation.

The difference in the mortality before and since 1905 is due partly to improved technique, but no doubt principally to the fact that in the older series the surgeon was called in when the infant was already greatly reduced after the failure of medical means, whereas the American surgeons quoted above would operate as soon as the diagnosis was made, without waiting to see the results of dieting, lavage, and so forth. We consider, personally, that a fortnight is a suitable period during which to try medical means.

RESULTS OF OPERATION FOR CONGENITAL PYLORIC STENOSIS.

Paterson (literature up to 1906)	Gastrojejunostomy	25	13	3	9
	Pyloroplasty	9	3	1	5
Scudder's three series since 1905		36	5	0	31

Apparently the operation does not lead to any reduction in the mass of the pyloric muscle. A baby operated on by Murphy recovered well from the operation, but died six and a half months later from causes unconnected with the gastric trouble: the tumour of the pylorus persisted unchanged. Scudder states that in nine cases after a gastrojejunostomy in these infants, bismuth skiagraphy showed that the food passed through the stoma and not through the pylorus: it is well known that the food passes only through the normal passage and not by the stoma after a short-circuiting operation in patients or animals with no pyloric obstruction; evidently, therefore, the mechanical obstruction of the circular muscle persists.

After successful operation, the children grow up into normal individuals. A very sturdy boy, aged six, on whom gastrojejunostomy was performed in his second month, is known to the writer.

To summarize, we may conclude on the evidence before us that medical treatment will save certainly less than half the patients, perhaps so few as 10 per cent, and that the survivors may suffer from persistent symptoms of pyloric obstruction; that the operation mortality in early cases is less than 20 per cent, but may be 50 per cent if medical treatment has been persisted in before the surgeon is called; and that neither medical nor surgical treatment leads to any improvement in the pyloric hypertrophy.

REFERENCES.—Miller, *Medical Diseases of Children*, 1911, 260; Paterson, *Lancet*, 1906, i, 577; Scudder, *Ann. Surg.* 1914, lix. 239.

A. Rendle Short.

PYONEPHROSIS.—There are two types of pyonephrosis, and the prognosis is different in each. The first type is pyonephrosis secondary to uronephrosis (hydronephrosis), or uropyonephrosis; the second is pyonephrosis developing from acute pyelonephritis.

In uropyonephrosis the condition is unilateral, and the actual obstruction is situated high up in the ureter, being due to a stricture, stone, or duplication of the ureter. The superadded infection is usually haematogenous.

Pyonephrosis developing in pyelonephritis occurs especially in cases of old-standing disease of the lower urinary organs, such as stricture, chronic prostatitis, enlarged prostate, growths of the bladder, etc. There is frequently bilateral disease, but the second kidney is not necessarily pyonephrotic.

The general symptoms of uropyonephrosis are often moderate, although in some cases the character of the illness resembles that of the other form of pyonephrosis.

In pyonephrosis due to pyelonephritis the patient is seriously ill, with a high swinging temperature and other symptoms of toxæmia. Unrelieved pyonephrosis may lead to a fatal result in ten or fourteen days; or the course may be more prolonged, and the pus find its way through the wall of the sac and form a perinephritic abscess, death taking place from exhaustion after some weeks.

The prognosis depends upon the patient obtaining prompt relief by operation, and upon the presence or absence of infection of the bladder and of the second kidney. In a few cases where a mild infection of a hydronephrotic sac has occurred, it is possible to do a plastic operation for removal of the obstruction, and what remains of the kidney is saved. In the majority of cases, however, the choice lies between nephrotomy and nephrectomy.

Nephrotomy can be performed in the very worst cases when the patient is weak from prolonged suppuration, and in cases where it is impossible to estimate the value of the remaining kidney, or when this organ is known to be the seat of advanced disease. The mortality of this operation is from 17 (Küster) to 23 per cent (Tuffier). After the operation an improvement in the work of the second kidney is usually observed, and the general health greatly improves. In 27 per cent of cases the sac shrinks and the patient is cured.

In a certain number of cases septicæmia persists, and the work of the second kidney is still poorly performed. This is due to continued suppuration in the thick fibrous-walled cavity, to undrained pouches, to abscesses in the walls and partitions, to stones being left in the sac (16 per cent of cases), or to the persistence of the ureteric block. A fistula remains in from 45·6 per cent (calculous pyonephrosis 34·2 per cent, non-calculous pyonephrosis 57·1 per cent) to 56 per cent (Küster).

Secondary nephrectomy is indicated when septicæmia persists; when it is believed, from the inadequate secretion of the diseased kidney and the absence of disease in the second kidney, that a depressed renal function in the latter will improve after nephrectomy;

and when the patient is gradually losing ground from prolonged suppuration. The mortality of secondary nephrectomy is only 5.9 per cent. If this be added to the mortality of nephrotomy 23.8 per cent., the total mortality of nephrotomy followed by nephrectomy at a later date is 29.2 per cent.

Primary nephrectomy should be performed when it is certain from examination of the urine of the second kidney that the function of this organ is adequate. The mortality of this operation is 17 per cent.

The prognosis after nephrectomy, in cases where the second kidney and the bladder are healthy, is very good, and there is no reason to expect that the duration of life will be shortened. On the other hand, in cases where there is chronic cystitis which does not clear up after nephrectomy, and especially where the second kidney is already infected, the danger of acute pyelonephritis of the remaining kidney, with suppression of urine, is very considerable. Even if this take place, however, the outlook is not hopeless. The writer has performed nephrotomy on the solitary kidney in such a case, and the patient is known to be alive and in fair health several years after.

J. W. Thomson Walker.

PYOSALPINX.—(*See* SALPINGITIS.)

RECTAL PROLAPSE.—In young children, the great majority of cases of prolapse of the bowel get well in the course of a few months with simple treatment (replacement, purgatives, astringent lotions, etc.). It is not possible to quote exact statistics. It is only in a few instances that any operation is required.

In adults, on the other hand, there is little tendency to amendment, and operation will be necessary. Paraffin injection is going out of fashion; although it may be immediately successful, cases of ischio-rectal abscess have been recorded at a long interval afterwards. When only the mucous coat prolapses, searing it to the muscle with the cautery is very successful. Severe cases require excision, and this is usually satisfactory, though temporary incontinence may follow; this nearly always gets well at last. In a few rare cases colopexy is necessary; this is well spoken of; no doubt failure is very rare, but the writer has seen a case.

F. Rendle Short.

RECTUM, CANCER OF.—Prognosis in carcinoma of the rectum largely depends on the stage at which the disease is detected. In this connection it is impossible to insist too strongly upon the importance of a digital examination of the rectum in every patient, whatever his age, presenting rectal symptoms. It must be borne in mind that rectal cancer may occasionally occur as early as the second decade of life. A cylindrical-celled carcinoma of the rectum has been reported in a girl of eleven, the youngest case of carcinoma on record.

Cancer of the rectum begins upon one aspect of the bowel wall as a small ulcer, which spreads circularly along and across the bowel. As it spreads it puckers up and contracts the affected area of mucosa,

and thus strictures the bowel. Accordingly intestinal obstruction or perforation is the usual cause of death in untreated cancer of the rectum. Even when a well-defined stricture has formed, a bridge of normal mucosa can still be detected forming part of the circumference of the stricture, and the breadth of this bridge gives some idea of the stage which the cancerous ulcer has reached. Even more important is it to determine whether the growth has passed outside the walls of the rectum. If the growth is fixed to its surroundings, this is probably the case. The vertical extent of the growth in the axis of the rectum is a less important point. It used to be considered that a rectal growth was only operable if the examining finger could pass through the stricture and feel normal mucosa above. With modern methods, extension of the growth along the bowel for a considerable distance is not in itself a bar to operation.

It must be remembered that methods of estimating the operability of a growth from local examination only are open to fallacy. In certain cases, while the primary growth is still small and mobile, metastases may form in the liver, probably owing to cells carried there by the blood-stream. On the other hand, fixation of the growth may result from merely inflammatory changes. A final estimate as to the operability of a rectal carcinoma can only be given when the abdomen has been opened and its interior examined manually. This is one of the advantages which the combined abdomino-perineal operation possesses over other methods.

Since most cases of cancer of the rectum occur in advanced life, the general condition of the patient's health—and more especially the condition of the heart and kidneys—is an important element in the prognosis. Unless their vital organs are fairly sound, patients cannot be expected to tolerate an operation for the extirpation of the growth. On the other hand, apparently delicate patients, if free from organic disease, often stand severe operations well. The worst subjects apart from organic disease are, in my experience, of the stout florid type with soft tissues, especially if alcohol has been habitually indulged in.

Prognosis as regards Recovery from Radical Operation.—The following table by Tuttle, quoted by Swinford Edwards, gives the mortality of the different methods of operation up to the date of its publication:

MORTALITY OF THE VARIOUS OPERATIONS FOR RECTAL CANCER.—(*Tuttle.*)

[illegible]	[illegible]	[illegible]	[illegible]
Sacral - -	913	211	23·1
Perineal - -	569	76	13·5
Abdominal -	49	18	36·7
Combined -	22	9	40·9

These figures show a high mortality for all methods except the perineal. At the present time they do not afford a correct view of the risk involved in the abdomino-perineal method, a risk which by improved technique is reducible, as I shall be able to show, to a fraction over 15 per cent. In my opinion, with rare exceptions, and possibly excluding squamous-celled growths beginning in the anal region, the only two operative procedures worth considering in cancer of the rectum are: first, abdomino-perineal excision of the rectum with the formation of a colostomy; second, simple colostomy.

This view excludes the possibility of retaining the natural faecal outlet at the anus, an end very desirable in itself. But attempts to bring down the upper colon and attach it to the sphincters are very dangerous to life. The mortality of an abdomino-perineal excision terminated by bringing down the bowel is at least double that of the same operation terminated by a colostomy. Even if the patient survives the operation, the anal sphincters may subsequently become fibrotic and useless. The danger of recurrence of the growth in the anal structures left behind is also a very real one. In most cases, too, the final result is a sacral anus, owing to the breaking down of part of the line of union of the bowel.

But what of excisions of the rectum performed from below? While some surgeons, notably Mr. Harrison Cripps, have recorded satisfactory results in a considerable number of cases, others, especially Mr. W. Ernest Miles, have experienced recurrence in almost every case. My own experience of these operations accords with that of Mr. Miles. But it has not been my good fortune to meet with early cases, where the growth is small and well localized to one portion of the bowel wall. In such cases some competent authorities, e.g., Mr. Lockhart-Mummery, would advocate perineal excision. I agree with Mr. Lockhart-Mummery that very stout patients, those with impaired constitutions, and those over seventy, are unsuitable subjects for the abdomino-perineal operation. In such cases I should perform a simple colostomy. But even in small early growths, if the patient is a suitable subject, I should advocate the complete operation; for it is known that glandular involvement may occur when the local growth is still in an early stage, and the abdomino-perineal operation is the only procedure by which reasonable security can be attained.

As regards immediate risk, the perineal operation is undoubtedly the safer procedure at present. But as the combined operation is being rapidly improved, I anticipate that its mortality will soon fall to 10 per cent. Mr. Cripps's mortality for perineal excision is 8 per cent (3 deaths in 38 cases). Mr. Miles, among 26 cases of the abdomino-perineal operation, lost 10, a mortality of 38 per cent. The same operation, perhaps however on rather more restricted lines, shows in my own hands a mortality of 2 among 13 cases, excluding a fatal case in which a large fibroid uterus was removed at the same time. Only one death occurred in the first ten cases, a result mainly due, I believe, to the method of post-operative saline infusion which I

advocate. My present mortality thus works out at only 15 per cent, a figure which is not unsatisfactory. Since the foregoing paragraph was written I have performed the operation in 11 further cases, with 2 deaths.

My experience shows that the abdomino-perineal operation, though necessarily a severe one, is fairly safe when performed under favourable conditions. Age is not a bar to it, for my series of successful cases includes two patients over sixty years of age. It must be preceded by a careful preparation of the patient, with the object of rendering the lower bowel as aseptic as possible and of increasing his resisting power to micro-organisms. For this latter purpose the prophylactic use of vaccines is advisable. During the perineal portion of the operation, and after the rectum has been removed, it is well to mop the raw surfaces freely with 1 1000 flavine solution, as an additional precaution against sepsis. The operation should never be done except in a fully-equipped operating theatre and in the operator's familiar surroundings. If this rule is broken, minor *contretemps* will sooner or later occur, which in such an operation may have serious consequences.

Prognosis as regards Recurrence after Operation.—The published results of Mr. Ernest Miles show the prognosis of different methods of operation in the hands of the same surgeon. They are a convincing testimony to the superiority of abdomino-perineal over perineal operations.

In his search for the ideal method, Mr. Miles has passed through various stages. He describes how, between 1889 and 1900, he did operations from the perineum, with section of the bowel one inch above the margin of the growth. These operations were followed by recurrence in an average period of twelve months. During 1902 to 1904 he performed fourteen operations with a wider removal of the perineal skin and the ischiorectal fat, the operation otherwise remaining the same. Recurrence took place in every case, and was most common in the levator ani. In a third series of eleven cases, 1904–5, Kraske's method was adopted; the mesorectum and the levatores ani were extirpated, and the bowel was divided three inches above the uppermost limit of the growth. Recurrence took place in every instance, and seven of the recurring growths involved the lower margin of the bowel and the adjacent mesocolon. As Miles remarks, these recurrences probably arose either from pre-existing permeation of the apparently healthy rectal wall, or from metastases in the paracolic lymph nodes—that is to say, the disease returned in tissues situated above the field of operation. He accordingly decided to excise as much of the pelvic colon and its mesocolon as he could reach. After this operation recurrence followed in every case, and in fourteen cases it took place in the pelvic peritoneum and the pelvic mesocolon tissues which could not be removed by an operation performed entirely from below. Miles accordingly abandoned the perineal method; he had performed it successfully in 58 patients, of whom 55 were known

to have suffered from recurrence, a percentage of return of 94·82 per cent. Since abandoning the perineal operation, Miles has developed an abdomino-perineal method, which in many details is his own. He has done this operation 42 times, with a mortality of 40 per cent. The operation would appear from his statistics to be unjustifiable after the age of sixty, since no patients who submitted to it beyond that age recovered from it. Among the 25 patients who have survived the operation, only 4 have had recurrence of their disease. At the present time 19 patients are living, and 10 of them have survived the operation more than two years without, up to now, showing any sign of recurrence. These results are a brilliant advance on any that have been hitherto published.

Among my own 11 cases who survived the operation, 1 is living five years later but has recently developed signs of recurrence, and 1 died of her disease about a year after the operation. The other 9 are alive and well, so far as I know: one is doing full work as foreman at a lead works, another as a policeman; four of them have been seen or heard from recently. Most of my cases are too recent to claim as successes, but the results to date are satisfactory. A final judgement on the abdomino-perineal operation will not be possible for some years, but its superiority over the older methods is already established.

Mr. Lockhart-Mummery, in his recent work, quotes the following percentages of three-year cures following the perineal methods of operation: Harrison Cripps 25 per cent, Hochenegg 17·2 per cent, Tuttle 14·8 per cent. These figures were no doubt obtained by a selection of cases far more rigid than is now applied, a fact which must be borne in mind as increasing the advantage shown by the combined method.

Influence of Radium Treatment on Prognosis.—The value of radium in cancer of the rectum is not yet determined, but Wickham and Degrais (1913) state that inoperable cases of cancer of the rectum have certainly found in radium a palliative and useful treatment, that radiation may clear the passage by dissolving the nodules, that the haemorrhage, discharge, and pain diminish, and that the general condition of the patient consequently improves. In two cases they were able to avert a colostomy, and to prolong a tolerable existence for periods of twelve and fifteen months respectively.

It is obvious that the subject has not yet reached a stage in which general statements are possible, and in any particular case the results of treatment are uncertain. A case of my own shows that radium may convert an inoperable into an operable case. The patient, a man of sixty, was pronounced beyond the range of operation by a well known surgeon, and was brought to me for a second opinion. I agreed that the case was inoperable, and advised a trial of radium. The treatment was carried out by Dr. N. Finzi. Within a few weeks the edges of the growth became flat and fibrotic, so that it might have been mistaken for a simple stricture; slight mobility could now be detected in it. I then advised and carried out an abdomino-perineal

radical operation. Two tubes of radium were inserted at the operation into the pelvic cavity, one from below and one from above. The peritoneum forming the floor of the rectovesical pouch was infected, and the operation was here necessarily an incomplete one. Whether as a radium effect or not, suppuration occurred in the pelvis, and during convalescence a troublesome attack of pyelitis occurred; but at present, four years later, the patient remains well and free from recurrence.

Cases suitable for Colostomy.—In a very large proportion of the cases unsuitable for radical operation, an immediate colostomy is the proper line of treatment. The operation should not be deferred until obstruction is imminent. As Mr. Swinford Edwards says: "That I would perform a colostomy on every patient upon whom I had decided that a radical operation was inadmissible I will not say, but rather that I would strongly advise the operation as soon as any of the symptoms of the disease became so marked as to interfere with the comfort of the patient." This statement, in my opinion, rather under-estimates the importance of colostomy. The operation is not merely a means of increasing the patient's comfort; it appears to exercise a definite influence in retarding the progress of the disease.

Prognosis after Colostomy.—The prognosis in cases of cancer of the rectum treated by a simple colostomy is much more hopeful than is generally believed.

First, in regard to the question—Is life worth living with a colostomy wound? Upon this point most patients, and some medical men, are apt to take quite unjustifiably gloomy views. Numbers of people with a colostomy opening go about their daily work, and are to all appearance normal individuals. Thus, a well-known police magistrate with this disability sat on the bench for some years; among patients of my own, one is a foreman at a factory, another a police constable doing full duty, another a dressmaker who made frequent Continental journeys in the course of her business. There are two conditions essential to a successful colostomy: one that the opening shall be well situated (preferably in the midst of the rectus muscle) and properly made, the other that it shall be properly managed by the patient. An injection of soap and water, followed by the use of the bed-pan before rising in the morning, will usually ensure freedom from trouble during the day. Care must also be exercised by the patient in regard to diet, and laxative foods must be taken in strictly regulated quantities.

Having considered prognosis with regard to comfort, we may turn to the outlook in regard to the symptoms of the growth and its rate of advance. The diversion of the septic stream of fæces from the surface of the ulcer is followed in practically all cases by a diminution or cessation of mucopurulent discharge from its surface. Accordingly, the teasing diarrhœa or rectal tenesmus produced by the irritant discharge diminishes or ceases, especially if the lower bowel is periodically washed out through the colostomy wound with a mild

antiseptic such as boracic lotion. There is a corresponding improvement in the bleeding, and, except in very advanced cases, in the sacral pain, for both of these signs are mainly of septic origin. For some years the patient may be able to forget that the growth, though quiescent, is still present. Sooner or later, however, sciatic pains will indicate infiltration around the sacral plexus, and frequency of micturition, with albuminuria and haematuria, will indicate invasion of the bladder. Compression of the ureters will be followed by ascending pyelonephritis, which is likely to end the case if in the meantime hepatic metastases do not manifest themselves.

The period of relief from symptoms which follows a colostomy varies widely. It may be estimated at from one to five, or even seven, years. In one case within my knowledge a simple colostomy was followed after some years by complete cicatrization of the growth, spontaneous closure of the colostomy, and re-establishment of the natural anal evacuations—an instance of the natural cure of cancer; it is probable, however, that in this case the disease will ultimately re-assert itself.

While a properly made and managed colostomy wound need give little more trouble than a set of artificial teeth, an ill-made prolapsed one, with colitis of the bowel above and sepsis about the opening, is undoubtedly a misery to which some patients will consider death preferable.

W. Sampson Handley.

RELAPSING FEVER.—The mortality of relapsing fever varies considerably according to the type of the disease. In the European form the mortality was 4 per cent in Western Europe, but 15 per cent in Russia, while Sandwith reported a similar death-rate in Egypt. In the American form it is from 2 to 6 per cent. In India, Vandyke Carter had a mortality of 18 per cent in Bombay, but more recently Choksy gives it at 30·7 per cent in 7131 cases in the same city, while during an outbreak in the United Provinces it was 26·5 per cent.

According to V. Carter, one-half the deaths occur during the acme of the first paroxysm, and one-fourth more during the first remission. The rest take place later, commonly from complications such as pneumonia, cerebral hæmorrhage, or exhaustion. Deep jaundice is a bad sign, while abortion often results.

In the African form of the disease the attacks are mild in natives, but more severe in Europeans. According to the Cooks, the death-rate in Uganda is 13·6 per cent, while in recovering cases great prostration remains.

Until recently no specific treatment for the disease was known; but now it is established that such arsenical preparations as salvarsan and galyl, in moderate doses intravenously, best given shortly before a crisis, destroy the spirilla and are likely to reduce the mortality considerably.

Leonard Rogers.

RENAL CALCULUS.—(*See* KIDNEY AND URETER, CALCULUS OF.)

RHEUMATIC FEVER.—The prognosis here must depend upon the particular organs that are most affected in the attack. If they are vital ones, such as the heart and brain, and are severely injured, the risk to life is great; but where the articulations chiefly suffer, though there may be great distress, the actual danger to life is but small.

It is a very difficult undertaking in this disease to single out a particular manifestation and lay down rules that apply to it alone, for in the course of the illness we continually find one lesion obscuring the prognosis of another. There still remains, however, a demand for the prognosis of the individual lesions, and the writer will accordingly first consider, under the general term 'rheumatic fever,' the prognosis of the articular manifestations.

There is another difficulty in the prognosis of rheumatic fever which is caused by the inadequacy of the name. If we use the term rheumatic fever, we discover that the disease may occur without fever in childhood, and that such a lesion as rheumatic pericarditis may be present with a subnormal temperature; yet in childhood also the term acute rheumatism is often inapplicable, for the onset may be most stealthy.

The condition most comparable to rheumatism in its general course is tuberculosis, for in both there occur febrile and afebrile attacks, gradual and acute onsets, and all degrees of duration.

Fulminating cases of acute rheumatic arthritis are apparently not so frequent as they used to be. In rheumatism, as in gout, we do not meet with so many of those cases from which have been drawn the pictures of the disease we read in our text-books of twenty-five years ago. As Litten observed, the type of the disease has apparently become more septic in character.

The prognosis in these acute attacks, provided the heart is not damaged, is good, and acute rheumatic arthritis tends to complete recovery.

Since the introduction of salicylates, such cases have been much easier to handle; but when we search for accurate facts upon the exact improvement they have produced in the prognosis, we are baffled. There are several important reasons for this. On the one hand, the frequency of some degree of heart affection is more generally realized, and the knowledge of the behaviour of the disease in childhood is much more definite. On the other hand, with our increasing knowledge, we are getting milder cases under supervision more readily. We have one element, that of cardiac infection, leading us to think that the disease lasts quite as long as heretofore, and the other, the treatment of the milder cases, leading us to think that the duration of the disease is shortened.

It is some forty years since these drugs were first used in this country by Dr. T. J. Maclagan, and in the early eighties careful statistics were made to elucidate the value of such treatment as compared with the alkaline method, or the natural course of the disaese. These investi-

tions showed conclusively that pain was rapidly relieved and fever covered. Dr. Pye Smith found that in 180 out of 355 patients these mptoms were arrested in five days, but in only 3 out of 24 cases eated expectantly was there the same good result.

The influence upon relapses was much disputed: Dr. Pye Smith 193 relapses in his 355 cases; Dr. Donald Hood found 34 relapses 50 cases treated without these drugs (4 per cent), and 182 in 1250 ses treated with them (14·6 per cent).

To the writer, it seems that our conception of rheumatism has so anged that it is not possible at the present time to express in statistics influence of the salicylates. This is clear, that these drugs have lasting effect upon rheumatic processes, for fresh infections or ecrudescences are very frequent in childhood; but acute articular umatism is greatly relieved and the pain and distress are much nished. For these reasons the prognosis is improved.

There are, however, some cases in which the articular symptoms, ough less violent, are more intractable, requiring large doses of the cylates to keep the symptoms under control. It is a matter of ation as to whether there are cases in which these drugs are ineffectual, t it has been the writer's experience to see some in which, while eral of the joints recover completely, others drift into a rheumatoid ndition, and believing as he does that there is a rheumatic form of umatoid arthritis, he is not prepared to accept the dictum that an thritis which does not yield to the salicylate treatment is necessarily rheumatic. We are here face to face with the great problem of present time in the treatment and prognosis of rheumatic fever — the salicylates *specific* antidotes? This much we can assert with ard to the arthritis, that when it does not react to this method of atment, and yet is of what we call the rheumatic type, the prognosis to the future is uncertain.

Hyperpyrexia, although less fatal since the introduction of the d-bath treatment, is still, despite the salicylates, of very uncertain gnosis. In late years it has been a very rare occurrence; the nution in frequency did not occur at the time of the introduction salicylate of soda, however, but some years later, and this may an an alteration in the character of the disease of temporary ration, rather than the possession of any real control of the ptoms.

Mental symptoms may, in adult life, though rarely, add considerably the gravity of the prognosis of acute rheumatism. Great depression, even mental derangement, may occur. Unless there is a previous ory of mental instability, a gradual recovery may be expected. ther troublesome group of symptoms in the adult are abdominal. se may take the form of dilatation of the stomach or troublesome ding and gastralgia, or again of pain located apparently in the bowel and leading to troublesome distention or obstinate hic- h. Recovery may be much delayed by these complications. ther rheumatism is a cause of acute appendicitis has not been

certainly established, but should this prove to be the case it is clear that the prognosis in such a complication is to be judged by the general indications that govern the prognosis of appendicitis. Where rheumatic fever attacks a patient living in an insanitary house, the character may become almost typhoidal. There is great prostration, and the tongue becomes dry and cracked, the course is long, and troublesome vomiting may prevent the use of the salicylates. Although the eventual recovery may be good, it is slow, and the illness may last for months.

There is little to guide us as to the prognosis of future attacks. Our common sense tells us that if the original attack in an adult is dependent upon some gross exposure to chill and to general carelessness, there is good hope that with proper care in the future the first attack will also be the last.

The writer believes that if there is recurrent tonsillitis with obviously diseased tonsils, their enucleation will improve the outlook.

In general terms, then, the outlook in acute articular rheumatism is good as to life and to complete recovery; but such a general statement is of little value, seeing that in a large number of cases the heart is more or less affected, and that upon the degree of this affection the prognosis in acute rheumatism mainly depends. In children the articular symptoms are of little prognostic importance.

There seems no serious difference in the prognosis dependent upon the variety of salicylate compounds used in the treatment. Those who push these drugs usually combine the sodium salt with sodium bicarbonate, but others claim that the acid aspirin is even more effectual. In the severe articular forms the writer prefers the salicylate of sodium, finding it less likely to upset the digestion; but it must be premised that only the purest drugs are used. It is important to remember that in childhood, if these drugs are pushed too heavily and without reference to the particular patient, bad and even fatal results may follow in a case of moderate severity.

As a general guide, it is useful to recognize three classes of arthritic lesions in rheumatic fever:

1. The acute severe type, recovering rapidly and completely.

2. The relapsing subacute type, also recovering, but more slowly. Such attacks may leave some weakness in the larger joints.

3. The more pernicious type, drifting into the rheumatoid group. This latter, many authorities regard as non-existent.

There may be great muscular wasting in some of these cases of severe rheumatic arthritis; and in children in whom the hands are badly affected, the result may resemble precisely the rheumatoid arthritis of young adults. Very good recovery may, however, result though the improvement is generally slow and such cases are not frequent.

The prognosis in the cardiac affections is discussed elsewhere (*see* RHEUMATIC PERI-, MYO-, AND ENDOCARDITIS)

F. J. Poynton,

RHEUMATIC PERI-, MYO-, AND ENDOCARDITIS (ACUTE). It is most essential that we realize that these three lesions are not as a rule independent entities in rheumatism, but that the cardinal lesion of severe types is a carditis affecting to a greater or lesser extent all parts of the heart. Both in the child and adult these cardiac lesions are the ones that chiefly influence the prognosis of rheumatic fever, and because of their greater frequency in the child it is generally admitted that the prognosis is the more serious at this early age.

The outlook is very grave when severe carditis occurs in a child with a family history of rheumatism on both sides, in the very young (five years and under), and in those who are surrounded by poverty and neglect.

The most virulent cases are liable to commence abruptly with somewhat ususual symptoms, such as vomiting and diarrhœa, severe shivering or sudden acute thoracic pains, and considerable fever. On the other hand, we must be prepared to find that a general carditis may gradually appear in some delicate children with remarkably few alarming signs, and though the course is more protracted than in the first group, the ultimate result may be most unfavourable.

1. **Pericarditis.**—This is the commonest cause of a fatal event in acute rheumatism. The cause of death is the general carditis, but the pericardial lesion is the most evident warning of this occurrence.

Some of the most dangerous cases show remarkably little fever, and in the last days of the illness the chart may even give a subnormal record. This is a point that should not be lost sight of by those who regard a fall of temperature at the time of the administration of salicylates as necessarily a good omen. Livid pallor, a rapid small pulse, great dilatation, and feeble cardiac sounds are signs of a deadly infection, whether nodules develop or not. Delirium is a bad sign, but it is not at all frequent in childhood. The fatal issue may be unexpectedly abrupt from syncope. Those who are acquainted with this virulent form of rheumatism will recognize at once from the general appearance and rapid development of the heart disease that the prognosis is very bad, for, should the patient rally for the time, the heart is usually irretrievably damaged, and the more speedy death is really the happier event. Fortunately, these cases are comparatively rare, and we know that pericarditis is more often an event in a recurrent attack of cardiac rheumatism. This fact is one of considerable interest, for it reminds us that with recurrent infection the resistance seems to lessen, a principle which may be also applied to the endocardial lesions.

The occurrence of nodules is much more frequent in the child than in the adult, and the lesion is one which leads us to consider with particular care the prognosis of the case. Dr. Cheadle made the general statement that these lesions were as a rule associated with grave heart disease, and that the prognosis was accordingly grave. This general rule holds good. Thus, out of 39 of the writer's cases that came to hospital showing nodules among other manifestations, 15 died.

Although, then, this lesion is a very important one in prognosis, we must not fall into the error of looking upon its occurrence as a sentence of death. The writer has seen rare cases in which the heart has been scarcely damaged, and in which excellent recovery has followed. There are other cases in which the nodules disappear, and the heart though damaged, makes a good recovery and becomes well compensated, and the child does not suffer from another attack of rheumatism while under observation. We must guard against the error of mechanical precision in judging of these cases, and not permit ourselves, on detecting nodules, to state dogmatically that the condition is hopeless; on the contrary, though justified in fully admitting their prognostic importance, we must judge each case by the broad lines of clinical inquiry, and above all must estimate the degree of cardiac damage. This is the more necessary because it may not have occurred to some physicians that these nodules are only the visible evidence of a process which occurs elsewhere in the subcutaneous tissues without forming visible projections, as post-mortem and histological investigation has shown. This being the case, it is quite possible, though clearly difficult of proof, that in many more cases than we think, some degree of local subcutaneous infection occurs short of obvious nodule formation, and the actual appearance of the prominences will then only represent a somewhat greater severity of this same process.

In adolescents the occurrence of nodules is also as a rule associated with grave, but by no means necessarily fatal, heart disease.

Among the less virulent cases, we can recognize a group in childhood in which there is obstinate and recurrent carditis, with a subacute and recurrent pericarditis. In these there are numerous manifestations, such as nodules and erythemata, endocarditis is invariable, and more than one valve may be attacked. The outlook is bad, for though these children may pass through one or more attacks, even in convalescence they never seem to be quite free from rheumatism, and the heart is irretrievably damaged. In London we see a number of these cases, of all degrees of severity, and they include some of our most favourite and our most familiar hospital in-patients. There is a third group in which only a single acute attack of pericarditis may occur, and among them are seen examples of remarkable recovery, the heart apparently throwing off the infection with very little, if any, permanent injury. In a few of these the cardiac valves seem to escape entirely, although such an event always rouses the suspicion that the illness is not rheumatic. These are not difficult cases to recognize; the child is usually a strong one, the pericarditis is evanescent, the symptoms are mild, and the cardiac dilatation is fleeting. Unfortunately, in the hospital class we do not meet with many of them, but in the well-to-do they are more frequent.

In the adult, pericarditis is much less frequent, but when it occurs the prognosis must always be cautious, for here again it is an indication of a grave infection, and the damage to the myocardium is at this age a very serious event. Nevertheless, there are all grades of severity

in the adult as in the child, and good recovery may occur even when the patient is over fifty years of age. The guiding principles lie in the estimation of the virulence of the attack and the degree of cardiac injury that results.

The prognosis of carditis and pericarditis must also be influenced by the degree of care in convalescence. At all ages this is of the greatest importance, and it is very advisable to picture the pathological changes that occur in this carditis, for thus alone can we realize the rest that is needed for the inflammation to subside, the exudation to be absorbed or organized, and the heart to compensate for the necessary curtailment of functions. Attention must be paid not only to the physical signs in the heart, but also to the general condition of the patient: for the heart may show good evidence of recovery, but the behaviour of the patient may warn us not to commence to apply the steadily increasing calls upon its powers until this recovery has become assured for some while. We have to be reminding the parents continually that, for the child, the problem is not one of the immediate future, but of his whole career.

It is useful in considering the prognosis of rheumatic pericarditis to recognize three main types:

1. The acute and transient.
2. The subacute and relapsing.
3. The virulent form proving rapidly fatal, or, if less severe, leading irresistibly into the second variety.

The influence of adherent pericardium upon the prognosis takes us beyond the scope of acute rheumatism. (*See* PERICARDITIS.)

Pericarditis is always a long illness, although in the most favourable cases all activity of the lesion may be over in three weeks. The quieting down of active symptoms marks, however, only the commencement of that very gradual and cautious convalescence upon which the real progress so greatly depends. The guiding principle in this stage is not to take an abstract period of time, but to study the behaviour of the heart in each cautious forward step. Some patients get forward much faster than others, and these lose rather than gain by prolonged and complete rest. Others need more rest than would have been expected. In both instances, if progress is cautious, we can alter the details without doing any real harm, even if the advance has been a little too rapid. It is the abrupt transition from invalidism to ordinary life that may alter the prognosis of this condition from good to bad. The temperature, the pulse-rate, the character and position of the cardiac impulse, and the nutrition of the patient are guiding points. Three weeks of normal temperature after a rheumatic pericarditis is in general terms, a useful time to allow before attempting to make any forward step at all.

2. **Acute Myocarditis.**—The importance of this is well recognized, but the accurate estimation of its severity is not yet within our powers, and for this reason we must temper dogmatism with caution. The more modern methods of cardiac examination are helping us with the

study of arrhythmias that may result from rheumatic myocarditis, but we must not take the occurrence of arrhythmia as necessarily an index of the power or weakness of the cardiac muscle, and we must remember also that the unit of arrhythmia—the extra-systole or premature contraction—is one which requires much more study before its true meaning is understood. Acute dilatation from myocardial poisoning may prove fatal even in childhood, but it is a very rare occurrence. When it occurs, there are such clear signs of cardiac failure and intense illness that the danger is apparent.

A much more frequent occurrence is cardiac dilatation followed by the failure of the heart to compensate for a mitral lesion which clinically appears to be one of ordinary severity. These are the mitral cases that run such a disastrous course at all ages. The action of the heart remains feeble and rapid, and the dilatation only recovers in part. The child is short of breath, and cardiac tonics do not produce the effect that is wished. An adult, if forced by circumstances to return to work, soon breaks down, with evident signs of mitral insufficiency. In such cases, the factor of an adherent pericardium always comes in for consideration, but there is no doubt that in many of them no such complication has occurred. There can be little doubt that the most important element in the prognosis is the early recognition of this myocardial weakness, and a determined attempt to cope with it by prolonged rest and care at its first appearance. When once such a heart as this has been overstrained, the outlook is bad. It need hardly be added that, if this be true of mitral cases, it is even more so of aortic or combined mitral and aortic lesions.

There is a third group of cases in which the myocardium appears to suffer almost alone, and the valves to escape: these are not the virulent acute cases mentioned above, but those in which, after an attack of rheumatism, the heart remains dilated, the action rapid and often irregular, pallor, and symptoms of breathlessness, nervousness, and palpitation, with or without syncopal attacks, are prominent, and there is a real danger, owing to the absence of a definite valvular murmur, of considering the condition as neurasthenic. Such a condition is very obstinate, but in childhood good recovery may be made after many months. In adult life much will depend upon the occupation. The mildest examples of this condition are the transient dilatations which occur so frequently in first attacks of rheumatic heart disease, and from which recovery may be rapid and complete if their true meaning is appreciated.

It will be apparent that in dealing with the prognosis of myocarditis in rheumatism we are continually driven to realize its existence, not by a clinical sign, but by evidence that we have put too great a strain upon a heart which we believed was stronger than proved to be the case. This difficulty must always be remembered as one of the most important facts in the study of rheumatic heart disease.

Once more we may usefully recognize three classes:

a. The acute simple dilatation which with care recovers completely.

1. The subacute chronic cases that require much time and attention before a good result is obtained.

2. The virulent cases which may actually prove fatal but more frequently much increase the danger of concomitant pericardial and endocardial lesions.

3. **Acute Endocarditis.**– Simple rheumatic endocarditis is never fatal, for the lesions are small and would be negligible if it were not for the functions of the structure attacked. Just the bearing of these lesions upon the ultimate prognosis is of immense importance.

We can lay down some useful guiding lines upon this point from clinical experience. We recognize that the combined aortic and mitral lesion, particularly if the aortic is predominant, is a grave event. In childhood these cases, if severe, usually point to a great tendency to develop future attacks, and to a fatal termination before adult life is reached. The writer believes that if they survive to early adult life they are prone to develop malignant rheumatic endocarditis and sometimes they develop frequent attacks of angina pectoris. The solitary aortic lesion is rare in childhood, but if severe the prognosis is bad.

Simple mitral endocarditis, if associated with grave myocardial weakness, runs a very disastrous course in the young; but when, as is more usual, it is compensated, the outlook is good. If there is no further rheumatism, many of these cases recover in a way which can hardly be realized until they have been followed up some five or six years. The murmur, which was loud, and heard over a wide area, may disappear, or only be audible when the child is lying down, and even then perhaps only be recognized by the physician who has followed the case closely.

The writer believes that slight aortic lesions may also sometimes disappear.

Mitral stenosis does not, as a rule, give rise to symptoms in childhood, although its origin is frequent at this age, but if it does the outlook is bad. If, before puberty, recurrent bronchitis, embolism, or attacks of tachycardia, and cyanosis with dyspnœa, have occurred, or if there has been an attack of heart failure with dropsy as the result of this lesion, we must be prepared for invalidism and early death. On the other hand, slight mitral stenosis, though always more serious than slight regurgitation, may, after childhood, never make headway, and a useful life may follow. When, however, we take a broad survey of this lesion and couple with it the greater frequency of rheumatism in the poorer classes, we are forced to the conclusion that it represents a form of rheumatism which is very prone to dog the footsteps of its victim through life, and we find that death is very usual under forty-five years from chronic heart disease, or some accident associated with the lesion.

The following statistical points may be of service in helping the reader to focus some of the facts that bear upon the prognosis of rheumatic heart disease.

Taking 150 fatal cases in children under twelve years of age, we find the mortality somewhat greater in females: 59 per cent as against 41 per cent in males.

Allowing for the great difficulty there is in establishing without doubt that any particular attack is a first one, about 30 per cent of fatal cases occur in the first attack.

The age incidence of fatal cases rises to about the tenth year thus:

Up to 3½	years	0·6 per cent
3 to 4½	,,	3·0
4½ to 5½	,,	7·4
5 to 6½	,,	9·4
6½ to 7½	,,	12·7
7½ to 8½	,,	12·7
8½ to 9½	,,	15·3
9½ to 10½	,,	20·0
10½ to 11½	,,	12·0

At least 86 per cent of fatal cases of rheumatic heart disease show active rheumatism in the last illness, and death from chronic heart disease alone is very unusual. The cardiac lesions found after death are very definite and often very extensive.

In at least 90 per cent the pericardium is more or less damaged.

The mitral valve was damaged in 149 out of 150 cases, the aortic valve in 34 per cent, the tricuspid in 24 per cent, and the pulmonary in 3 per cent.

The multiple valvular lesions in the severe rheumatism of childhood are well exemplified by these numbers.

When confronted with a case of acute rheumatism in a child of five years or under, the following figures will give an idea of the conditions that may be expected.

Eight out of 52 such cases proved fatal, that is, about 16 per cent.

Definite heart disease occurred in about	85	per cent
Arthritis or arthritic pains	70	,,
Chorea	35	,,
Sore throat	20	,,
Nodules	15	,,

When we turn to adolescents and adults, and look into the after-histories of a considerable number, we come upon a very suggestive and interesting fact. Putting aside as beyond the scope of this article the numerous cases of death from chronic heart disease, we find the great danger is not carditis, but malignant endocarditis.

This point has such close bearing upon the prognosis in acute rheumatism, that the writer feels that he is not trespassing upon the ground of another contributor when he gives the examples shown in the table on the opposite page.

Closely allied, and probably of the same nature, were 7 further cases in adults, the victims of repeated rheumatism in childhood, who showed many of the signs of malignant endocarditis, and eventually recovered for the time, after long and dangerous illnesses.

TABLE [illegible] SHOWING THE SEQUENCE OF MALIGNANT ENDOCARDITIS UPON ATTACKS OF ACUTE RHEUMATISM.

[illegible]	[illegible]	[illegible]
M	10 years	13 years
[illegible]	6, 8, and 10 years	16
[illegible]	24 years	37
[illegible]	12 and 13 years	14
F	7 and 20 years	21
F	[illegible]	38
M	11, 14, 17, and 18 years	19
M	42 years	50
F	12 years	16
M	As a boy and at 16 years	27
F	12 years	16
M	7 years	13
F	12 years	17
F	8, 13, and 15 years	24
F	38 years	48
M	18 years	28
F	13 and 17 years	27
[illegible]	As [illegible] child	32

It is evident, then, that the physician who deals with acute rheumatism in the adolescent and adult must take into account the possibility of malignant endocarditis, and this particularly in the cases in which the aortic and mitral valves have been both damaged by previous rheumatism. Whatever interpretation he may choose to put upon the occurrence of these malignant lesions, the fact of their intimate, and in the writer's opinion direct, association with the nature of the early illnesses cannot be put aside in the prognosis of acute rheumatism.

A study of 2000 post-mortem examinations upon adults brought home this fact to the writer, that more rheumatic patients die from malignant endocarditis than from an acute rheumatic carditis such as occurs in children, or indeed from any form of acute rheumatism that is generally recognized.

The influence of treatment by special drugs or by special methods upon the prognosis of rheumatic endocarditis is most difficult to estimate. The most important claim in recent years has been that the salicyl group, if used effectively, is a specific to the rheumatic process. The writer is not himself at all convinced upon this point. He would express his own view by the statement that in a case of acute rheumatic carditis he would not feel confident that pushing these drugs would not do harm rather than good. He has seen this method of treatment used on many occasions, and yet at the time of writing has still this feeling of lack of conviction. Such a method as Dr. Cabot's has much improved the prognosis of early endocarditis by

demanding a complete rest for the patient, while a definite procedure, which in itself is devoid of any danger, is being carefully carried out by the physician. In the recent literature, the most decided claims have been made by Grenet, who treated rheumatic fever with intravenous injections of collobiase of gold (*Medical Press and Circular*, 1916). His results showed: (1) An analgesic effect; (2) A fall of temperature; (3) Abbreviation of the attack; (4) *Suppression of the endocarditis.* Twenty minutes after the injection a severe reaction occurs, with fever, severe rigor, and sweating; this lasts about three hours. He states that in 76 cases, 1 died in the reaction, 1 from active heart disease, and the remainder showed no heart affection. The writer is not aware of further statistics with regard to this method of treatment. *F. J. Poynton.*

RHEUMATOID ARTHRITIS. (*See* Arthritis Deformans.)

RICKETS. Rickets is a disease which invariably gets well when the patient passes from infancy to childhood, and although the older text-books describe a condition called "late rickets," which is said to be a relapse, it is very doubtful if there is any real relation between them. It is customary, at the present time, to speak of the spinal curvatures, coxa vara, genu valgum, flat-foot, and similar deformities as "static, not rickety."

On the other hand, although the rickets passes away, the deformities of the bones, if of marked degree, will be permanent. Thus if, in a young child, the knees are two or more inches apart with the ankles touching, it is probable that the condition of bow-legs will persist throughout life, if not remedied by operation. There is, however, a not very uncommon form where a child is born with the legs slightly bent, and there is a decided separation at the knees throughout infancy, which only gets well when the art of walking has been thoroughly learned; it is important to distinguish this from genuine rickets, the other signs of which are present.

The most serious consequences of rickets are due to the coincident affection of the nervous system. Tetany (carpo-pedal spasm) usually indicates grave malnutrition. Convulsions in children are usually associated with rickets, and are occasionally fatal. Laryngismus stridulus, though alarming, very seldom threatens life unless there is an actual laryngitis present. Marked rickets makes the prognosis worse if the child should develop an acute infectious fever, such as whooping-cough or measles. *A. Rendle S.*

RINGWORM.

Scalp. The prognosis in ringworm of the scalp has been revolutionized by the introduction of the *x*-ray treatment. Under the old conditions, repeated shaving of the scalp and the application of ointments, lotions, etc., it was common to meet with cases of two years' duration, even when every care was taken, and the ointment

etc., were applied by skilled persons. The writer has seen cases in which the endothrix fungus has been present for five years. The average duration of the residence of children in schools specially devoted to the treatment of ringworm, in Paris (Sabouraud) and in this country, was eighteen months. Under x-ray treatment, when complete epilation has been obtained, the scalp is usually free from infection in four or five weeks. Time has to be allowed for the hair to grow, and the average period during which a child need be kept from school is about three months. Where a cap can be worn, the child may return to its usual surroundings immediately the infected hair has fallen, that is, in about five or six weeks.

Re-infection must be guarded against by the complete sterilization or destruction of all infected caps, hats, etc.

Diseases of the Scalp does not give quite such good results, because in severe cases the true skin is sometimes involved, and prolonged treatment after epilation may be required.

Glabrous Skin. The prognosis is usually extremely good. With the removal of the infected epidermis by the use of iodine, or the application of ointments of chrysarobin or of benzoic and salicylic acids in combination, as suggested by Whitfield, a cure can usually be effected in a couple of weeks. Care, of course, must be taken that there is no re-infection. The so-called *eczema marginatum* of the groin is a variety of ringworm, and this readily responds to treatment, especially to the benzoic and salicylic acid ointment. *Ringworm of the toes*, which often occurs in association with the eczema marginatum of the groin, is less easy to cure. The infection persists between the toes, and especially in the thickened epidermis on the plantar surface at the fourth interdigital space. Recurrences in this site are quite common, and in some cases, where the nature of the condition has not been recognized, the trouble may continue for several years. The palms may be similarly affected, the eruption simulating pompholyx, and recurring every summer.

Nails. Ringworm of the nails may persist for years. The fungus is commonly of the endothrix type, and cure is often very difficult. The fungus involves the ungual plate and the root of the nail, and forms thick masses of scale under its distal end. Many months' treatment by scraping, and the constant application of antiseptics such as iodine or mercurials, may effect a cure. Norman Walker has obtained better results by soaking the nail in Lebling's solution until it is softened, and then dressing the base with copper sulphate solution. Complete avulsion of the infected nails and the application of local antiseptics may be insufficient to bring about a cure: the author has a case in which the infection has persisted for several years in spite of the fact that the nails have been removed on two occasions. Where the infection exists for a long time in the nails it is common for the glabrous skin to be attacked from time to time, and this point should be borne in mind in cases of recurrent attacks of tinea of the smooth skin.

Beard.—If the affected parts are thoroughly freed from hair by the forceps, or still better by the *x* rays, and then dressed with antiseptic ointments, the results are usually satisfactory. In the writer's experience, the more suppurative the ringworm of the beard, the speedier is the cure. It must be remembered that these cases closely simulate sycosis of coccogenic origin, which is notoriously difficult to cure.

J. H. Sequeira.

RODENT ULCER.—The prognosis in rodent ulcer depends upon early diagnosis. So long as the lesion is limited to the skin and subcutaneous tissue, there are several methods of treating it successfully. Radium therapy gives excellent results; I have cases of rodent ulcer treated by radium which have been free from recurrence for twelve years. The proper application of the *x* rays, with or without preliminary curettage of the raised edge of the ulcer, gives similar results. Cases treated thirteen and fourteen years ago are still free from recurrence.

Radium has occasionally proved successful when the *x* rays have failed to bring about a cure, and in the writer's opinion there are cases, especially where ulceration preponderates or there is deep infiltration, in which the converse holds true. In all cases treated by radium and by the *x* rays, the best results are obtained when the lesion reacts rapidly. If treatment has to be repeated again and again the prognosis is not satisfactory.

Complete excision of a superficial rodent ulcer, with a good margin of healthy skin around and below the lesion, gives admirable results; but where the ulcer is near the orbit, and particularly at the inner canthus, the operator often errs by removing too little, and recurrences are inevitable.

At the second International Surgical Congress, where the writer had the honour of presenting the *rapport* on radiotherapy, he recorded an average of 40 per cent of recurrences after treatment by the *x* rays. The statistics of operation were almost identical. A larger experience has shown that with the proper selection of cases for radiotherapy, and improvements in technique, especially in the giving of massive doses through appropriate screens, these results have been materially improved.

Where a rodent ulcer has involved cartilage or bone, or where the orbital cavity has been invaded, the prospects of complete cure are more remote. Thorough and early clearing out of the orbit will often save the patient for some years. Removal of the maxilla, when the disease has involved that bone and the accessory sinuses, may be necessary. In some cases, a judicious combination of operation with radium and radiotherapy may effect a cure, but it is difficult to remove entirely the deeper foci of the disease without producing grave mutilation.

The *prognosis as regards the duration of life* is not as serious as one would imagine, for patients often live for many years with a hideous cavity

in the face. The writer has seen one such of forty years' duration. A fatal termination is brought about by septic infection of the sinuses of the skull, meningitis from extension to the cranial cavity, general sepsis, and exhaustion. Constant care in preventing septic infection, by the application of antiseptic dressings, irrigation, etc., alone can prevent these dangerous complications.

Mention should be made of the use of carbon-dioxide snow in the treatment of superficial rodent ulcer. Satisfactory results are often obtained, but relapses are more common than with radium or x rays. On several occasions the writer has had to apply radium after failure to cure a rodent ulcer with the solid carbon dioxide.

Gray recently showed a case of extensive disease in which an admirable result has been obtained by the revival of an old method of treatment, viz., the application of arsenical paste. *J. H. Sequeira.*

RUBELLA (GERMAN MEASLES). The prognosis in this disease is almost invariably excellent. I have met with but 1 death in between 400 and 500 cases. Cobbin has reported that there was not a single death amongst 1523 consecutive cases admitted to the London Fever Hospital during the twenty-one years 1887 to 1907.

Complications are rare. I have twice observed *otitis media*. The fatal case referred to above occurred in a boy, age 3, who succumbed to *acute cardiac dilatation* following a slight attack of arthritis.

E. W. Goodall.

RUPTURED VISCERA.—(*See* ABDOMINAL INJURIES.)

SALPINGITIS.—From the point of view of prognosis, a distinction is made between chronic non-suppurative inflammations of the tube and ovary and the ordinary pyogenic suppurative conditions which are considered under the heading, pyosalpinx.

Salpingo-oophoritis. There is probably no more difficult problem in gynæcology than in a given case of salpingitis to form an idea as to the end results. In the majority almost all information is to be gained from the record of the subjective symptoms, and very little from physical signs, so that errors and uncertainties in diagnosis hold sway. Although the symptoms and general reaction to an affection of the appendages may seem comparatively trivial, yet the far-reaching results of such a condition will make it necessary that guarded prognosis be given, and so much concerning the immediate as the end results. In fact, the cases showing acute initial signs requiring active treatment, for that very reason often do better in the long run than the subacute forms.

The Infecting Organism. Some difference in prognosis might be expected according to the infection. In some measure this is probably true, but the difficulty of determining the nature of the infecting agent, chiefly part due to the similarity of symptoms irrespective of the causal agent, very frequently renders such information valueless. The tuberculous lesion is usually very chronic, commonly occurs in

young unmarried or non-parous women, and is only temporarily relieved by prolonged palliative treatment. In gonococcal lesions, it is currently believed that with one tube infected the opposite tube will be likely to become inflamed. Also, in acute gonorrheal forms, one is rarely in fear that general peritonitis will supervene.

An inflammation following an abortion or occurring during the puerperium is usually of streptococcic nature, and produces a condition of pelvic peritonitis—a definite clinical condition known as perimetritis, ending in most cases in partial or complete recovery, or more rarely passing on to a pyosalpinx.

Effects of Salpingitis. The effects, more especially the remote effects, may be enumerated and considered irrespective of the causal agent. In the first place, there is no doubt that pelvic adhesions in the majority of cases owe their origin to a previous salpingitis. These adhesions may be symptomless and only discovered during the course of other operative procedures; but generally they give rise to ill-defined symptoms of pain, varying greatly in intensity, and often causing considerable distress. The inability to recognize such adhesions on examination often leads to a diagnosis of neurosis, and to lack of success in treatment. Again, conditions frequently associated with salpingitis are the retro-displacements of the uterus, especially of the fixed variety. Or the development of a hydrosalpinx may give rise to pressure symptoms, or cause displacement of the uterus or rectum.

The Results of Treatment.

Expectant. In the acute varieties of salpingitis the recognized form of treatment consists in absolute rest, douches, and saline purgation. Findley[1] quotes Fraub, of Amsterdam, as reporting cures in 70 per cent of cases as a result of this mode of treatment. The cures, however, were not absolute, as in a limited number there were relapses; but he maintains that at least 50 per cent of cases of salpingitis require no operative treatment. The average duration of treatment under this expectant method was six weeks; however, in some cases it was as short as three weeks, while in others it extended to as many months. Unfortunately, it is only the better classes who are able to submit to the longer periods of rest.

Finally, there is no doubt that there is a very good chance of recovery, if the treatment is persisted in. It has not infrequently happened that patients who have been recommended to submit to operation, and who have been pronounced to be very unlikely to conceive, have yet recovered and borne children.

Operative. In the chronic forms of salpingitis, which do not react to medical means, and in which the symptoms indicate the necessity for further measures, the only alternative lies in surgical intervention. The immediate operative results are uniformly good, as is seen in the accompanying figures taken from the annual reports for the years 1912 and 1913 of the Chelsea Hospital for Women.[2] Number of cases operated on in 1912, 61—no deaths; in 1913, 55—no deaths; a total of 116, with no deaths.

The operative risks are therefore not great; but it is necessary to consider how often this treatment leads to complete recovery. It is undoubtedly true that in a few instances relief does not follow operative measures; but this is often the result of omitting to remove the uterus as well as the tubes, or due to faults in technique, which in the near future may be much improved.

Pyosalpinx. The operative treatment of pyosalpinx shows results very different from those in chronic salpingo-oöphoritis. It is in fact one of the most serious operations in gynæcology, the mortality being only exceeded by that of Wertheim's hysterectomy for carcinoma of the cervix. Thus, in the returns of the Chelsea Hospital for Women for the last two years, operations for pyosalpinx were undertaken in 31 cases, with 5 deaths, a mortality of 16·1 per cent. Such a death-rate appears exceedingly high; but many of the cases were very seriously ill. Injury to the bowel during the course of operation accounted for a certain number of deaths.

In those cases recovering, there is a strong likelihood of adhesions forming between the peritoneally denuded surfaces of the pelvis and viscera; also when the uterus is preserved, unless the precaution of fixing it to the abdominal wall be taken, there is much likelihood of fixed retroversion occurring during convalescence.

Tuberculous Salpingitis. With regard to the operative treatment of this condition, the results seem to be uniformly good, provided the tuberculous material be all removed. No other measure can offer equally good results.

[illegible] *Diseases of Women*, 1911, 467; "Chelsea Hospital for Women," *Annual Reports*, 1912 [illegible]

Robert Greenhalgh

SARCOMA OF BONE. (*See* BONE: TUMOURS.)

SARCOMA, MELANOTIC. (*See* MELANOTIC SARCOMA.)

SCARLET FEVER.—It will be convenient to consider the prognosis of this disease under the following heads: (1) *Age*; (2) *Sex*; (3) *Severity of attack*; (4) *Special symptoms*; (5) *Complications*.

1. **Age.** During the years 1900 to 1909, 153,553 patients suffering from scarlet fever were admitted into the hospitals of the Metropolitan Asylums Board. The fatality at the different ages is shown in the following table:

FATALITY ACCORDING TO AGE.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	11·7	[illegible]	[illegible]	25–30	[illegible]
[illegible]	11·1	[illegible]	1·7	30–35	[illegible]
[illegible]	8·0	[illegible]	[illegible]	35–40	2·8
[illegible]	[illegible]	15–20	1·1	40 and over	2·2
[illegible]	[illegible]	20–25	1·7	All ages	1·0

It will be seen that, under fifteen years of age, the younger the patient the greater is the chance of death. The first three years of life are the most dangerous.

2. **Sex.** The fatality amongst males was decidedly higher than amongst females. For all ages it was 5·2 per cent for males and 2·8 for females. Under five years of age it was 6·7 for males and 5·0 for females.

3. **Severity of Attack.** It is convenient, for the purpose of description, to divide cases of scarlet fever into three classes: the *malignant*, or toxic; the *ungraded* or septic; and the *benign* or simple. The fatality of an epidemic or group of cases will depend partly upon the proportion of each of these three groups, and partly upon the proportion of children of tender years. Malignant scarlet fever is extremely fatal; very occasionally an adult will recover. But I do not remember ever to have seen a case amongst children under ten years of age which was not fatal. In this form of the disease serious symptoms come on very rapidly, and, in children, death takes place within four days. A feature of malignant scarlet fever is the slightness of the faucial inflammation. But usually the temperature rises high, the rash is vivid, the pulse very frequent (150 per minute or more), the respiration stertorous, and the skin and mucous membranes dusky. The patient is practically delirious or comatose, and vomits frequently.

Benign scarlet fever, on the other hand, is never fatal, unless through some complication, e.g., nephritis, and then but rarely.

Most of the deaths in scarlet fever are connected with the faucial lesions of the anginosus variety, and these may assume various forms. Briefly, it may be stated that the more extensive the inflammation and the more extreme the swelling, the greater the prospects of a severe or fatal issue; the more widespread, is sure to result, conditions which are very favourable to the development of septic cocci or pneumococci. There is a variety of the disease, not often met with, which holds an intermediate place between the benign and the anginosus forms in respect of the prognosis. I refer to what is known as the *hyperpyretic form*. In this, the temperature remains raised for three or four weeks, and yet the faucial lesions are moderate in severity. If death takes place it is nearly always due to some complication.

It is a popular belief that an attack of scarlet fever occurring in a pregnant or recently delivered woman is more often fatal than that of unmixed severity. But my experience points in the opposite direction. During the twenty-one years 1892 to 1912 there were at the Eastern Hospital Homerton, 10 cases of women who had been affected by scarlet fever just before or just after delivery. In only 1 of the cases was the attack severe, and in only 1 could death be attributed to the scarlet fever. There were 4 other fatal cases amongst these women, but in all of these there were present before the symptoms of scarlet fever set in, septic conditions, such as puerperal phlebitis, lacerations of the uterus, etc., which were quite sufficient to account for the fatal result.

4. **Symptoms of Special Seriousness.** These are repeated

vomiting, continuous excessive frequency of the pulse (over 150, especially in adults), sighing respiration, coma, a prolonged high temperature, prolonged delirium and restlessness, or a dusky or purple appearance of the skin. These symptoms are most often met with in malignant scarlet fever, but they may be observed in some cases of the anginous form. To what has been stated about determining the prognosis in the latter it may be added that, in spite of the return of the temperature to the normal and the improvement in the local lesion, the pulse-rate remains unduly frequent, the patient continues to waste, and there is looseness of the bowels and occasional vomiting, the prognosis is unfavourable.

7. **Complications.**—These are most frequently met with during or after an attack of anginous scarlet fever. Seldom in an attack of the malignant variety of sufficient duration to allow of their occurrence.

Cervical Cellulitis.—This is one of the most fatal complications, when severe, excessive; it is the most common it is. These children, however, are those in whom the cellulitis involves the whole of the neck below the jaw, from one ear to the other.

Albuminuria.—Marked albuminuria and diminution in the quantity of urine occurring during the first week or fortnight of an attack of scarlatina, however, are to be regarded with apprehension, for they are not frequently the sole expression of a particularly severe form of nephritis. Second there also be coma or amaurosis, with muscular twitchings, convulsions, is still more grave. A purpuric condition supervening at any stage of the disease is nearly always serious.

The common form of scarlatina nephritis, that which is a sequel rather than a complication of the disease, most often follows a severe, not a mild attack. It may begin abruptly, with vomiting, pyrexia, hæmaturia, scantiness of urine, and occasionally a rigor. But it may also begin insidiously, with little else but albuminuria. On the whole, the more abrupt the onset, the less likely is the attack of nephritis to be prolonged, whereas the cases with an insidious beginning are usually tedious. The duration of an attack of nephritis varies from four to eight or ten weeks. The vast majority of the cases recover completely and do not become chronic.

It is not often that the renal lesion is the cause of death. When this event occurs, it is usually due to some such intercurrent affection as pneumonia or pericarditis, so that the occurrence of these complications is unfavourable. The fatality of nephritis is about 8 per cent., and is higher among children than adults. Of symptoms that are due to the nephritis itself, the most unfavourable are drowsiness, coma, a marked diminution in the amount of urine excreted, and uræmic amaurosis. The last symptom is seldom met with in cases that have been brought under treatment at an early stage. Convulsions, though serious, are by no means so grave as the symptoms just enumerated; they are prone to arise without the slightest warning, in cases which are by no means severe and are apparently progressing favourably.

The incidence of nephritis varies considerably. The average for the ten years 1900 to 1909 in the hospitals of the Metropolitan Asylums Board was 1·6 per cent in 153,607 cases of scarlet fever. It is highest in children, and especially in those between the ages of five and ten years, and of the male sex.

Rheumatism.—The prognosis of the attendant rheumatism which not infrequently follows an attack of scarlet fever is usually favourable. It is not often that cardiac complications occur, at any rate in those cases in which arthritis is manifest. There are reasons, however, for thinking that cardiac or pericarditic cases in the course of scarlet fever occur oftener than is supposed, and that they either are overlooked or do not give rise to symptoms, till long after the scarlatinal attack is past.

Pyæmia.—This is an extremely unfavourable complication of scarlet fever.

Laryngeal Diphtheria.—Such an event is seldom met with except in the malignant form of the disease, and it makes the outlook grave. Even if the patient recovers, a more or less pronounced stenosis of the larynx results.

Otitis Media.—The prognosis is usually favourable, provided that the appropriate treatment has been constantly used. But the complication is apt to resist treatment, which must, therefore, be carried out with unremitting care to prevent the occurrence of any serious impairment of hearing.

Tuberculosis.—An attack of scarlet fever will often have a most prejudicial effect on patients who are the subject of tuberculous lesions. Not only is the part affected by tubercle likely to become worse, but nephritis is prone to occur and to be prolonged. (J. H. G.)

SCHISTOSOMIASIS.—This disease is caused by the *Schistosoma cypriacum*, and is a chronic disease affecting chiefly abdominal organs and producing cirrhosis of the liver and dysenteric symptoms. The prognosis is bad, about 10 per cent dying directly of the disease and a still larger proportion from secondary infections. (*Leonard Rogers.*)

SCIATICA.—This term is applied to pain in the region of the sciatic nerve and its branches. Sciatica includes both *sciatic neuralgia* and *sciatic neuritis*, and in every individual case we have to decide which of these two is present.

Many cases of sciatic neuralgia occur independently of any affection of the nerve, e.g., in disease of the vertebræ (whether tuberculous or arthritic), in affections of the sacro-iliac joint or the hip-joint, in diseases of the pelvic viscera, osteomyelitis, etc., in intermittent arterial claudication, etc. In other cases, especially in gouty and rheumatic subjects, we have to do with a sciatic neuritis, in which the fibrous sheath of the nerve trunk becomes thickened and inflamed.

Sciatic Neuralgia.—The prognosis of sciatic neuralgia, secondary to disease of other structures (vertebræ, pelvis, sacro-iliac joint, or

[illegible] femur, etc., depends upon the possibility of relieving the primary cause.

Sciatic Neuritis.—This is a somewhat obstinate malady; it may last for months or even years, varying in its intensity from time to time, and being specially liable to relapses. The presence of muscular atrophy and the diminution or loss of the Achilles-jerk in the affected leg indicate that definite degenerative changes have occurred in the nerve fibres. Anæsthesia in the cutaneous distribution of the nerve is not common, and is indicative of a still more severe degree of degeneration. Nevertheless, the ultimate prognosis, even in the most lingering cases, is usually favourable, except in senile and debilitated patients.

Bilateral sciatica is always a more serious affair. It may be due to diabetic neuritis, or it may be symptomatic of gross disease of the abdomen, or in the sacral region of the spinal cord or the cauda equina, or of the bones of the vertebræ or pelvis.

In every case of sciatic neuritis, rest and avoidance of violent movement are desirable. Recent cases often subside rapidly under hot wet applications, as, hot poultices, radiant dry heat, hot mud-baths (or hot light baths, wet or dry, etc.), combined with anti-gouty or anti-rheumatic remedies, as the case may be. In other cases, excellent results are obtained by counter-irritation (e.g., by iodine, fly-blisters, or better still, by a Paquelin cautery) applied to the tender points along the course of the nerve. Electrotherapeutic methods, in the hands of an expert, are often useful, especially the employment of a galvanic current, with or without ionization by various drugs; or of the static wave current; or, in chronic cases, of static sparks along the course of the nerve trunk. Sometimes obstinate cases of sciatic neuritis, which have resisted other means of treatment, are relieved by injecting directly into and around the nerve sheath large quantities of saline solution (50 to 100 c.c.), to which may be added a small proportion of an analgesic drug (e.g., 1 per cent cocaine); or the fluid may be injected, in smaller quantity, into the roots of origin within the sacral canal, by means of so-called epidural injection through the sacro-coccygeal foramen. Cutting down upon the sciatic trunk, dissecting it out, and forcibly stretching it, had a vogue some years ago, but is rarely prescribed nowadays; it appears to have no special advantages over saline injections.

Purves Stewart.

SCLEROSIS, DISSEMINATED. *See* DISSEMINATED SCLEROSIS.

SCOLIOSIS. The following factors govern the prognosis in scoliosis. Apart from treatment, the deformity often gets worse in growing children, but when growth ceases it is usually arrested. There is no tendency to natural cure. The patients are bad subjects for chest diseases later.

To find an answer to the question as to what benefit may be expected from treatment by exercises, massage, etc., the patient's

[illegible] into the best possible position for the [illegible]. It will be possible to [illegible] that position [illegible] by [illegible], but if the [illegible] the [illegible] will not do so. It [illegible] relief of pain and prevention of further progress of the [illegible].

[illegible] other factors influence the outlook.

1. **The Cause.** If there is a [illegible] of the [illegible] can be done to straighten the spine.

2. **The Age and Duration.** Recent [illegible] are better than old standing. The younger the patient, the better the prognosis. [illegible]

3. **The Type of Patient.** [illegible]

4. **The Degree of Deformity.** [illegible] Fixed bony deformity cannot be [illegible], but with the same [illegible] degree of deformity there is much variation in the result of treatment. [illegible]

5. **The Nature of the Treatment.** In early cases [illegible] In old fixed cases it will be necessary to supplement this by a supporting jacket to relieve [illegible] pain.

[illegible] Tubby, *Deformities* [illegible] 1912; Noble Smith, *Curvatures of the Spine*, 1896; [illegible] 1914 [illegible]

[illegible]

SCROTUM, CARCINOMA OF. This disease is uncommon except in sweeps and tarworkers. It is one of the least malignant of all forms of carcinoma, but we have very little in the way of exact statistical evidence bearing on the point. Patients sometimes present themselves who have certainly had the growth for years. No doubt apart from treatment it would prove fatal at the last.

The Operation Mortality is small. Of 58 cases at St. Bartholomew's Hospital 2 died, both being very bad subjects. Probably clearance of the groin glands would slightly increase the mortality.

The End-results have been studied by Butlin. Excluding 2 cases which died from the operation and 2 more in which the glands were involved but not removed, we have the following: 7 cases recurred; 5 cases followed up to three years are well; 8 cases followed over three years are well.

Even amongst the recurrences a second operation was several times successful. It is true that recurrence is occasionally very late, probably in some instances it is really a new cancer.

We have no figures to show whether it pays to remove the groin glands. This was done in some of Butlin's cases, but not in all.

REFERENCE. — Butlin, *Operative Surgery of Malignant Disease*, 2nd ed.

[illegible]

SCURVY.—Scurvy is not nearly so common as formerly [illegible] [illegible] died of the disease. [illegible] 1 per cent. [illegible] sudden syncope. [illegible] As the patient improves [illegible] [illegible]

SECONDARY ANÆMIA.—(*See* ANÆMIA, SECONDARY.)

SEPTICÆMIA.—[illegible]

SINUS THROMBOSIS, LATERAL.—(*See* INTRACRANIAL COMPLICATIONS OF EAR DISEASES.)

SKULL, GUNSHOT WOUNDS OF.—(*See* GUNSHOT WOUNDS.)

SLEEPING SICKNESS.—*See* TRYPANOSOMIASIS.

MICROCOPY RESOLUTION TEST CHART

SMALL-POX. — The prognosis of this disease must be considered in so far as it is influenced by the following factors: (1) *The Age*, (2) *Sex*, and (3) *Race of the patient*; (4) *Nature of the attack*; (5) *Presence of special symptoms*; (6) *Occurrence of complications*; (7) *Character of the epidemic*: and, further, by the very important factor, (8) *The condition of the patient in respect of vaccination*.

1. **Age.**—Amongst the *unvaccinated*, all the evidence goes to show that small-pox is very fatal to the young. If we refer to times in which the disease was not controlled by vaccination, we find that amongst the total number of deaths from small-pox at all ages, the proportion amongst children under five was very high. Thus, at Geneva, during the years 1580 to 1760, there were 25,349 deaths from small-pox; 83 per cent of these were children under five years of age, and 48 per cent were under two. At the Hague, for fifteen years, the proportion of deaths under five was 73·4 per cent; in Sweden, during the years 1770 to 1798, 78·4 per cent; in Kilmarnock, during 1728 to 1764, 90·5 per cent; in Chester, in 1774, 89 per cent; in Manchester, during 1768 to 1774, 95 per cent; in Warrington, in 1773, 94 per cent; and in Edinburgh, during 1764 to 1783, 94 per cent. (See Dr. J. C. McVail's evidence before the Royal Commission on Vaccination.) There are no records which are extensive or accurate enough to furnish a definite statement as to the fatality at the different ages in those times; but if we argue from what has taken place amongst the unvaccinated during recent years, we may safely assert that then, as more recently, the fatality amongst young children was high. The following table has been compiled from the annual reports of the Metropolitan Asylums Board (London), for the years 1892 to 1895 and 1901 to 1903, and from the reports of small-pox epidemics in several large towns in England (Leicester, Gloucester, Manchester, Oldham, Chadderton, and Bradford) during the period from 1892 to 1896, made to the Royal Commission on Vaccination. All cases doubtful as regards vaccination are excluded from these figures.

FATALITY OF SMALL-POX AMONGST THE UNVACCINATED, ACCORDING TO AGE.

[illegible]	[illegible]	[illegible]	[illegible]
Under 5	1510	645	42·7
5 to 9	1253	246	19·6
10 to 14	663	115	17·3
15 to 19	393	77	19·5
20 to 29	447	131	29·2
30 to 39	152	62	40·7
40 to 49	73	43	58·9
50 to 59	26	12	46·2
60 to 69	15	7	46·6
70 and over	6	2	33·3
Total cases	4538	1340	29·5

From this table it appears that, during the epidemics from which the figures are derived, the fatality was very high amongst children under five, that it fell considerably during the next two quinquennial periods, and then quickly rose again. But even the lowest fatality, 17·3 per cent for children between the ages of ten and fifteen years, is high; and the fatality for all ages, 29·5 per cent, is very high compared with that which is found in such diseases as typhoid fever and scarlet fever.

Amongst the *vaccinated*, however, i.e., those vaccinated in infancy, the prognosis is very different. The following table has been drawn up from the same reports of the Metropolitan Asylums Board and the Royal Commission as were employed for the preparation of the table given above relating to the unvaccinated, so that the two tables are very rightly comparable.

FATALITY OF SMALL-POX AMONGST THE VACCINATED, ACCORDING TO AGE.

[illegible]	[illegible]	[illegible]	[illegible]
Under 5	39	1	2·5
5 to 9	285	2	0·7
10 to 14	870	7	0·8
15 to 19	1752	30	1·7
20 to 29	4648	219	4·7
30 to 39	3097	335	10·8
40 to 49	1571	239	15·2
50 to 59	552	89	16·1
60 to 69	221	47	21·2
70 and over	66	13	19·5
Total cases	13101	982	7·4

From this table we find that, amongst the vaccinated, the fatality rate is under 5 per cent for persons under thirty. It is especially low between the ages of five and fifteen, being less than 1 per cent. After thirty, the fatality rises, and it is about 20 per cent amongst those over sixty. But even the highest fatality rates amongst the vaccinated are only a trifle higher than the lowest amongst the unvaccinated. And it may be concluded, from a comparison of the two tables, that while infant vaccination affects most favourably the prognosis at all ages, the most beneficial effects are to be noticed in those under thirty years of age, and especially in children between the ages of five and fifteen.

Unmodified confluent small-pox is extremely fatal in children under two years of age, and very fatal in those between two and five.

2. Sex.—Most authorities state that sex has very little influence on the prognosis. There are, however, few statistics, bearing on the point, in which the vaccinated are distinguished from the unvaccinated

cases. During the years 1892 to 1895 531 vaccinated males and 547 unvaccinated females were treated in the small-pox Hospital of the Metropolitan Asylums Board: 90 males and 112 females died, so that the fatality amongst the former was 16·8 per cent, and amongst the latter 20·8 per cent. But these figures are too small to warrant a general conclusion. During the same years, and at the same hospital, 1887 vaccinated males and 1565 vaccinated females were treated: of the former 58, or 3 per cent, died, of the latter 49, or 2·9 per cent. So that of those cases the fatality was the same in each sex. Welch and Schamberg state that in certain epidemics in Philadelphia the fatality among 1594 males was 27·4 per cent, and among 2606 females 25·7 per cent, and McCoombe puts the male fatality at 1 per cent higher than the female. These writers are referring to vaccinated and unvaccinated cases taken together.

3. **Race.** It has been stated by more than one author that small-pox is much more fatal amongst the dark races of mankind than amongst the white. There is instantaneous evidence to show that when the disease has been introduced into certain countries for the first time (as into Mexico when it was conquered by the Spaniards), the mortality, and apparently also the fatality, has been very large. The statement made above concerning race may have been true to a certain extent so far as the more remote past is concerned, but it is doubtful whether it is true at the present day. The following figures, given by Welch and Schamberg, refer to unvaccinated patients treated in the Philadelphia Municipal Hospital: Amongst 2036 whites there were 940 deaths, a fatality of 44·7 per cent; white amongst 637 negroes there were 315 deaths, a fatality of 49·4 per cent. The figures are scanty, and the difference in the fatality rates not very great. But the character of the epidemic is of great importance. Thus, the writers just quoted state that during the years 1898, 1899, and 1900, small-pox of an extremely mild type prevailed in certain parts of the United States, and that they treated in hospital 162 patients of whom 148 were unvaccinated without a single death; 150 of the patients were negroes. A very mild form of small-pox (known as Amaas) has also been prevalent during recent years amongst the Kaffirs in South Africa. This evidence, therefore, goes to show that race has very little influence on the mortality.

4. **The Nature of the Attack** is of great importance. I have added together the figures presented to the Royal Commission on Vaccination, which were obtained from various authorities, from Marson (1840 to 1851, at the Highgate Hospital) to Coupland (1896, in the Gloucester epidemic).

Amongst the *unvaccinated*, I find that of 478 malignant or hæmorrhagic cases, 451 died, a fatality of 94·33 per cent; of 5258 confluent cases, 2593 died, or 49·8 per cent, and of 7068 discrete (including those classed by Coupland as coherent) cases, 57 died, or 5·3 per cent. It will thus be seen that nearly all the hæmorrhagic cases are fatal. In respect of the confluent and discrete cases, the age of the patient

case be taken in conjunction with the character of the attack (see table given above), most of the deaths in discrete small-pox occur amongst children under three years of age.

Amongst the *vaccinated*, I find, from the figures given by the authors just quoted, that of 529 malignant cases, 425 were fatal, or 80·3 per cent.; of 5394 confluent cases, 963 died, or 17·8 per cent.; and of 9603 discrete cases, 42 died, or 0·4 per cent. It will be observed that in both the vaccinated and the unvaccinated the prognosis in the case of malignant small-pox is very grave. In confluent small-pox the prognosis is grave in the unvaccinated, much less so in the vaccinated. In all forms the prognosis is much more favourable in the vaccinated than the unvaccinated.

Generally, it may be stated that the more profuse the eruption of pocks, the graver is the prognosis.

3. **Special Symptoms.** — If the symptoms of the prodromal or initial period be mild, then the attack (eruptive stage) will be mild. But if the initial symptoms be severe, the eruptive stage will not necessarily be severe. Often it will be; often, also, it will not. Even an attack which proves to be very much modified is occasionally ushered in by severe initial symptoms.

Rashes.—Of the initial rashes, the scarlatiniform and morbilliform erythemas, whether generalized or local, are usually favourable, especially when the patient is vaccinated. The same remark is true of the pale sepia erythema described by Thomson and Brownlee under the designation 'capnitoid.' The generalized livid (dark plum-coloured) erythema is of very bad omen; so also are the erysipelatoid (rosacoid) erythemas, local or generalized.

The hæmorrhagic initial or prodromal rashes are, on the whole, very unfavourable. When the hæmorrhages are small (petechial), not very numerous, and of a bright red colour, the prognosis is not so grave as when they are small, very numerous, and of a purple hue. The vaccinated person has the better chance. The occurrence of scattered, purple, blue-black, or inky cutaneous and subcutaneous hæmorrhages is very ominous. In the very worst cases there is also an erysipelatoid erythema. The presence of hæmaturia, metrorrhagia, or bleeding from other mucous surfaces aggravates the prognosis.

The symptoms last mentioned are amongst those which are to be observed in malignant or hæmorrhagic small-pox, which, as we have seen, is an extremely fatal form of the disease. Death may take place on the third to sixth day, before the eruption of pocks has made its appearance. Not only the hæmorrhagic but the erysipelatoid initial rashes are prone to occur in malignant small-pox. The lumbar pain is often unusually severe. There is some hope of recovery in that form of hæmorrhagic small-pox in which the hæmorrhages are confined to the skin immediately beneath and around the pocks.

Pocks.—It has already been stated in regard to the eruption of pocks, that the more profuse it is, the graver is the prognosis. The outlook is especially bad when the eruption is already confluent in

the papular stage: then the papules are often softer and less prominent than usual. In the vesicular and pustular stages, it is an unfavourable sign if the pocks are whitish, flat, and collapsed, and if there is little or no swelling of the skin. It is, on the other hand, a favourable sign if the pocks, even though very numerous, run through the stages of vesiculation and pustulation to incrustation more quickly than usual; if the pocks are superficial; if they are small or of variable size; and lastly, if, whether in the vesicular or pustular stage, they are ill-developed. These modifications of the cutaneous lesions are, at the present time, most often due to previous vaccination.

If there are many pocks on the mucous membranes of the mouth, palate, pharynx, and especially larynx (as shown by signs of laryngeal obstruction), the gravity of the prognosis is much augmented.

In hæmorrhagic small-pox, the fatal event often takes place on the third to sixth day; in confluent and severe discrete cases, the dangerous period is that of the suppuration of the pocks, that is, from the sixth to twelfth day of the eruption (eighth to fourteenth of the illness). Complications are very likely to set in during this stage.

Other Symptoms.—Marked restlessness, insomnia and delirium, convulsions, coma, prostration, profuse diarrhœa, and, in children, grinding of the teeth, are all unfavourable symptoms.

6. **Complications.**—These are especially to be expected in the most severe cases, either during, or soon after, the period of suppuration of the pocks. Those which are both frequent and serious are œdema of the lungs, acute bronchitis, lobular pneumonia, acute dermatitis and cellulitis with suppuration, erysipelas, septicæmia, and pyæmia. More serious, but infrequent, are lobar pneumonia, empyema, gangrene of the skin (especially of the scrotum), arthritis, and acute myelitis. Ocular complications are common, especially after confluent and severe discrete attacks. Extreme inflammation and swelling of the lids is serious and leads to conjunctivitis, corneitis, corneal ulcer, and panophthalmitis, so that if the patient survives the attack of small-pox, his sight may be lost or impaired: but conjunctivitis and corneitis may occur independently of œdema of the eyelids. Otitis media is met with chiefly in children.

Influence of Pregnancy.—In Welch and Schamberg's book on *Acute Contagious Diseases*, a table is given in which are shown details of 113 cases of small-pox in pregnant women. From this table it appears that in 67 of the 113 cases, or 59 per cent, abortion or premature delivery took place; 7 of the patients, or 6 per cent, died undelivered; 20, or 18 per cent, recovered and went to delivery at full term; and 19, or 17 per cent, left the hospital still carrying the fœtus, and no further information was to be obtained concerning them.

In 73 cases in which the woman was attacked by small-pox before the completion of the seventh month of pregnancy, 41 aborted, or 56 per cent; while of 39 attacked after the seventh month, 25 were delivered prematurely, or 64 per cent.

The fatality was much higher in those who were prematurely

delivered than in those who were not: of the 67 in the former class, 28 died, or 41·7 per cent: while of the 46 in the latter, 7 died, or 15·2 per cent.

Miscarriage takes place most frequently during the eruptive stage; but the earlier in the attack it occurs, the more likely is the event to prove fatal. The more severe the attack, the greater the risk of premature delivery and death. Vaccination has a great influence in prognosis. Of the cases quoted, 27 had not been vaccinated and 20 of them died, a fatality of 74 per cent: of 85 cases in which vaccination had been performed "at some previous remote period," 14 died, a fatality of 16 per cent.

The writers point out that the death rate of small-pox in pregnant women varied in different epidemics: in their series, in three different epidemics, it varied from 13 to 51 per cent. The miscarriage rate varied less widely, from 55 to 64 per cent. In the very mild epidemic which prevailed in Trinidad during 1902 to 1904, Schault found that 27 out of 89 women miscarried, or 30 per cent: none died.

On the whole it may be concluded that an attack of small-pox is a most serious event for a pregnant woman, and that the vaccinal condition of the patient and the nature of the attack are of prime importance in determining the issue.

In respect of the child, the earlier in gestation the mother is attacked by small-pox, the more likely is the child to perish. In the later months, the child may be born with the eruption of small-pox set upon it, or, if it live, it may develop the rash later. A living child born of a variolous mother may not have small-pox at once, and yet is rarely immune to vaccination.

7. **Character of the Epidemic.**—Allusion has already been made to this factor when the question of the influence of race was under consideration. One epidemic will differ very widely from another in respect of its case mortality, that is to say, of the virulence of the immediate cause of the disease, whatever it may be. The fatality of the London epidemic of 1902 was 16·8 per cent, and of that of 1903 3·4 per cent. The epidemic in Sydney in 1913 was characterized by extraordinary mildness. Up to the end of that year there were 1070 cases, with but 1 death. Even young children had the disease in a mitigated form. Of the persons attacked, 93 per cent had never been vaccinated. This outbreak was also characterized by its low power of infectivity.

8. **Vaccination.**—One or two more points require to be dealt with under this heading which have not been touched upon in the previous paragraphs. It will be seen from the table, given above, of the fatality of small-pox in the unvaccinated, that on the whole it increases with age, that is, with the lengthening of the interval between vaccination in infancy and the attack of small-pox. We must now consider the question of the expectation of an attack of small-pox in those who have been vaccinated in infancy, when they are exposed to the infection of the disease. Very careful investigation into this point

were used in the epidemics at Sheffield, Warrington, Dewsbury, Leicester and Gloucester, and the results were reported to the Royal Commission on Vaccination. The inhabitants of houses visited by small-pox in those epidemics were divided into two classes, the unvaccinated and the vaccinated. The number of persons in each class was enumerated, and then the number in each was severally attacked by small-pox. A further separation was made of these persons into two groups, those under ten years of age, and those of ten years and over. Adding the totals from the two towns together we get the following figures:

PROPORTION OF UNVACCINATED AND VACCINATED PERSONS EXPOSED TO ATTACK, WHO WERE ATTACKED.

Unvaccinated	2547	1135	1805	1196	621	52·8
Vaccinated	5810	196	3·3	20822	5997	29·0

It will be noticed that the attack rate in the unvaccinated is not very different in those under or over ten. In the vaccinated, however, the attack rate is four times higher in those over than in those under ten. These figures deal almost entirely with persons vaccinated in infancy. The protective power of vaccination wanes as the length of time from the vaccination increases. But even after its power of preventing an attack of small-pox has gone, its influence in modifying the attack remains for a considerable time. It may also be stated that the incidence of the severe forms of small-pox is much less amongst the vaccinated than the unvaccinated.

The prognosis is also affected by the *efficiency of the vaccination*, as measured by the number and character of the vaccination scars. The larger the total area of the vaccination marks, the better the prognosis.

Re-vaccination will restore to the already vaccinated individual any loss of the immunity conferred by the primary vaccination. It is rare to meet with attacks of small-pox, and still more rare to meet with fatal cases, in persons who have been successfully re-vaccinated.

J. H. Greenwood.

SOLDIER'S HEART. At the present time this subject has a special interest, and is likely to demand attention for some years to come. No aspect of the matter is of more practical importance than its prognostic side. Put in a nutshell, the problem is this: What chance has the soldier with "D.A.H." (disorderly action of the heart) of complete or partial recovery? This problem is not double, as many cases. In the first place it constitutes a portion, and by no means

[illegible] important one of the tests [illegible] upon which [illegible] [illegible] in time in the [illegible]. In the second place [illegible] [illegible] probable fitness for civil life after military service. [illegible] [illegible] the first question we are able to give a fairly definite reply based [illegible] ascertained facts; to the second we can, better than a thousand [illegible].

Likelihood of Return to Military Duty. Parkinson has shown that after seven months only one-quarter of his patients had become fit for full duty. The exhaustive interim report of the Medical Research Committee gives the following figures relative to a series of 229 cases: Four months after discharge from the special hospital 14·8 per cent were shown duty overseas or were marked fit for it, 17 per cent were doing full duty at home, 11·8 per cent were on light and 11·5 per cent on sedentary duty at home, 9·5 per cent were still under treatment and 11 per cent had been discharged permanently unfit. It must of course be understood that all these figures apply strictly to men who are proved to be free from gross organic disease of the heart or other viscera. Thus would exist a small percentage of cases unfit for overseas service within a few months. At the other end of the scale are almost as large a class of men found permanently unfit. Between these extremes lies a large group of men who eventually become fit for light or sedentary duty.

In determining for each individual patient his chance of recovery the Hampstead workers who are responsible for the report published by the Medical Research Committee examine him from three points of view. First and foremost they apply *systematic exercises* to see how he bears them. His expression, colour, breathing, and heart rate are the indices upon which they rely. As he improves he is given more strenuous exercise. Finally those "who progress to the highest exercises and carry them out in conjunction with route marches are boarded as fit for full duty; men who progress more slowly and those who tolerate the highest grade of exercise less perfectly are boarded for light duty; while "those who show continued symptoms on lower grade exercises are discharged as permanently unfit" or retained for sedentary duties only. This highly practical test of functional capacity has the advantage of being not merely selective but also remedial (see below).

Second, the *history* of the condition must be examined to discover the main chances of quick improvement. In many of these patients there is an inherent predisposition to such cardiac disturbances as are classified as "D.A.H." This has often manifested itself during boyhood and led to the gradual abandonment of severe exercise. The patient had chosen a sedentary occupation for this very reason and was carrying on comfortably until the war came and thrust upon him strenuous exertion in the form of military training. Soon his heart begins to complain, and his is a case of "D.A.H." With regard to such men the Hampstead workers write: "Where the disability is of long duration it is relatively mild during the initial stages of training

and service [illegible] but if the condition changes for the worse in these men recovery is lower and more unsatisfactory than in those in whom a similar degree of disability has arisen more recently.

Among other causal factors infective disease needs consideration. Patients much debilitated by dysentery and other forms of diarrhœa often develop 'soldier's heart,' and the prognosis is then dependent on the underlying condition. Men with a history of rheumatic fever or chorea, even if incurred in childhood and not since, are very liable to this syndrome, and they do badly. On the other hand, cases in which the symptoms follow 'gassing' do well. Tobacco in moderation is worse than none at all: the prospect is better if these men smoke nothing, apparently.

Third, there are a few *symptoms and physical signs* which deserve notice. Let it first be said that no objective signs can at all compare with subjective symptoms in furnishing an index of the man's condition, progress, and prospects. The murmurs which are nearly always heard in such cases are quite without value in this respect (be it understood that this whole discussion relates only to those cases in which the presence of definite organic heart disease has been excluded).

The same is almost equally true of the extent and force of the apex beat. Rapidity of pulse is open to so much variation of all kinds that it is not in itself of any value. What is of value, however, is the readiness with which acceleration of the pulse is provoked (e.g. by sitting up in bed), and the time in which the rate returns to normal after such acceleration. The return should not occupy more than a minute. The longer it takes, the less favourable the prognosis.

Influence of Treatment on Prognosis.—Various methods of treatment have been put forward, but the only one that can be said to offer any certain hope is the graduated exercise method alluded to above.

According to the Hampstead workers, the period of stay in hospital amounts to no more than two months, whereas the average stay in hospital of patients treated by other means amounts to something over five months.

No drug treatment has any definite influence on the course of the disorder.

Future Fitness for Civil Employment. This side of the matter is of necessity obscure at present. Probably we shall find that the majority of the 'D.A.H.' patients, especially those who showed a predisposition to the trouble before the war, will return without much difficulty to their civil employments. On the other hand, those men who have developed similar symptoms apparently as a result of some infective disease are likely to be less fortunate. It is probable that in such cases the myocardium has suffered actual damage, and the possibility of recovery will depend on the patient's age and other circumstances.

Carey F. Coombs.

SPINA BIFIDA.—We shall have to consider (1) *The prospects generally apart from treatment*, (2) *The results of injection methods*, and (3) *The prognosis after operation.*

1. **Survival apart from Treatment.** It is quite certain that the patient may, in rare cases, survive and grow up. The report of the Clinical Society, many years ago, was able to present about a dozen such cases, several of whom were over twenty, and two over forty years of age; one or two had obtained a spontaneous cure by shrinkage. Nevertheless, this happy event must be regarded as very exceptional. In 1882, of 649 cases of spina bifida dying in England, 642 were in their first year, and a great number of these died within the earlier months. Morton estimated that only 1 per cent. grow up without treatment; this is probably too low a figure. Of 80 cases not operated on, 20 lived to the age of five.

The causes of death are rupture, leading to total drainage of fluid; meningitis; and hydrocephalus. The children who survive frequently suffer from cystitis, and may be paralyzed in their legs.

The only cases in which there is a reasonable prospect of survival are those of meningocele with a thick skin covering.

2. **Results of Injection of Morton's Fluid.** On paper, this is by far the best method of treatment. According to the report of the Clinical Society, of 71 cases, 35 were cured, 27 died, 5 were improved, and 5 not improved. Morton himself had 29 patients, of whom only 6 died. But a closer examination presents the picture in a very different aspect. The operative procedure is, of course, by no means so dangerous as an excision, and therefore those dying within a month are fewer; but the great majority of the 71 cases given in Morton's book have only been followed for a very short time; and when the book appeared, 24 of those whose history had been followed up were known to be dead. The cure was often partial; many tappings and injections were necessary in several instances, and occasionally there was no improvement even after this. It is therefore quite impossible, from such evidence, to obtain figures sufficiently reliable to compare with those obtained by operation. One can only say, in general terms, that the procedure itself is not very dangerous, even in young infants; that, if repeated, it usually causes some shrinkage of the sac; but that a great number eventually succumb to intercurrent ailments. At the Children's Hospital, Manchester, of 12 cases, 3 were cured, 8 died, and 1 was not improved.

Probably modern surgery has gone too far in abandoning the injection of Morton's fluid so completely as it has done.

3. **Prognosis after Operation.**—It is extremely difficult to obtain figures which are really comparable, because of the variations in the age at which the operation is performed. If the surgeon waits until an age when the weakly children will have died off, good figures can be obtained; if he operates in early infancy, in hopes of saving a few who would otherwise die, there will be a heavy mortality. A number of the children succumb in the next few months, even after operation.

Nicoll[illegible] of Glasgow, reports the results of operation on 32 cases, mostly spina bifida, treated by injection and undertreatment. Three cases had remained followed up more than a month or two; of these 7, or 21·8 per cent, died within a month.

Sutherland[illegible] in 1903, recorded 18 operations at Mikulicz's clinic. Of these, eighteen were after operation, and 12 recovered, 6 died within a year. Only 6 therefore were alive a year after, and of these were [illegible] cured, all being in the first place incontinent.

Mosse[illegible] in 1905, made a table of all the cases treated by operation mentioned in the Surgeon-General's Index Catalogue for nearly a century. He estimates that the mortality of the present time amongst children with spina bifida operated on in infancy is about 35 per cent, and that not more than half the total number are alive at the end of a year. If operation is postponed until they are five years old or over, the mortality is only 17 per cent. Even after operation, infants may develop hydrocephalus, paraplegia, or incontinence, and if these conditions were already present, it is very unlikely that they will be improved.

Boettcher reports a series of 39 cases operated on by himself: 13 died, and of the 26 survivors 12 died within a few months, and 14 (that is, 36 per cent of the whole) were cured. These were all cases of meningocele.

At the Manchester Children's Hospital[illegible] out of 8 cases treated by operation, 5 recovered and 3 died. The age is not stated.

At two Bristol hospitals, 10 infants have been operated on: 6 died, five of the deaths occurring within a few days; 1 has been lost sight of; 3 are alive, respectively three, five, and eight years after the operation. Of these three, one is quite well, another has incontinence, and the third has partly lost the legs dating from the operation. Of 7 children not operated on, 6 died within a few months, and 1, aged three years, is still alive, paralyzed, idiotic, hydrocephalic, incontinent, and always ailing.

Summary.—We may conclude, therefore, on the rather unsatisfactory evidence at present available:

1. That survival is quite exceptional, apart from treatment; and a surviving child will often be paralyzed and suffer from incontinence of urine or hydrocephalus.

2. That injection of Morton's fluid is comparatively safe at the time—but probably half the cases die within a few months, and in about one in seven the spina bifida is not cured.

3. That operation in early infancy has an immediate mortality of 35 per cent, and less than half the cases grow up; it cures the spina bifida, but will not improve any paralysis, incontinence, or hydrocephalus. In older children, over five, the mortality is low (about 5 per cent) and the prospect of cure excellent.

Cases of meningocele with a thick covering are favourable; syringomyelocele and meningomyelocele, especially with a thin covering, usually threaten early death, which is scarcely a calamity in view

[illegible]

[illegible]

SPINAL CARIES. The following points deserve attention in considering the treatment of the patient: [illegible] 1. The prognosis as to life. 2. The prognosis as to ordinary cases, and [illegible] 3. The prognosis when complications are present, and [illegible] 4. The prognosis when the disease is complicated by abscess [illegible] and paralysis of paraplegic [illegible]. Here we deal with [illegible] Pleural Abscesses.

1. **Prognosis as to Life.** Undoubtedly patients with spinal caries run some risk of early death. According to some old authorities quoted by Tubby, about a third of the cases die within a few years of the onset. Nowadays, it is quite certain that with anything like favourable circumstances and proper treatment the danger to life is much less than this. In 1903 Goldthwait published a study of the ultimate results of 62 cases treated in a Boston hospital and followed up for eight years afterwards, and including 29 with abscesses and 11 with paraplegia, only 11 died (including 8 abscess cases and 2 paraplegics). Tubby followed 99 cases for two and a half years; of these, 12 died. Patients seen in private practice or able to be treated at an open-air hospital such as Alton, do better still, and the true mortality is probably between 5 and 10 per cent. It must be admitted however that the patients are usually delicate all their days and not apt to reach a great age.

Menaces to life are infected abscesses, paraplegia leading to complicating troubles, pulmonary tuberculosis, and of course any evidence of commencing tuberculous meningitis, such as mental change, incessant vomiting, headache, or unexplained continued fever. In cases where there is great angular curvature a good many die of visceral lesions. In cervical caries there is some danger of sudden death by displacement.

2. **The Prospects of Cure in Ordinary Cases.** Given favourable circumstances, country air, and good treatment, the great majority of the patients make an excellent recovery, and may indeed become fine and hearty, though there is likely to be some permanent deformity. If the treatment was instituted early, this deformity will not usually be severe; any curvature already present at the commencement of treatment will probably be permanent, but it need not increase. According to Marsh and Watson, from 80 to 90 per cent of cases treated in private practice or at Alton, and taken early in the pre-curvature stage, recover completely. The treatment will last about two years, and supervision must be exercised for still another year.

The outlook is not always so encouraging. Social position makes a great deal of difference: in towns the children of the poor do badly. Young children are more likely to suffer severely or to die than adults. Pregnancy as a rule makes matters much worse. A long length of spine affected makes a bad prognosis. Situation in the dorsal spine is less favourable than in the lumbar.

Some years ago Tubby and Jones published statistics to show the effect of forcible straightening of the curvature at one sitting: although they have now abandoned the method, it enables one to obtain some insight into the ordinary prognosis in spinal caries. Of 99 cases followed for two and a half years, 44 recovered sufficiently to be able to walk, the curvature being improved or cured; 28 were still recumbent; 12 died; 15 were lost sight of. Further details are furnished: it is stated that 16 were no better; 17 developed abscess; 18 were, or became, paraplegic—of these, 12 recovered and 6 were still afflicted. It is declared that these figures compare well with those obtained by the usual conservative means.

It is probable that a further shortening of the time needed to effect a cure may be obtained by Albee's bone-grafting method.

Recrudescence in middle life is not very rare, but usually ends in recovery.

3. **Prognosis in Paraplegic Cases.**—All experienced observers agree that cases of paraplegia treated by prolonged rest and weight-extension, preferably in the open air, usually recover the power of walking, but this result may not be obtained for six, or even twelve, months. Probably about 80 per cent of the patients can be improved, if not cured, by this means.

There is a certain residuum in whom conservative measures do not appear to do any good, and where laminectomy may be indicated. It ought not to be resorted to until after long trial of the means already mentioned. Many years ago a few brilliant cures reported by Macewen and Horsley led the profession to overrate the value of operation in these cases.

End-results of Laminectomy for Paraplegia in Spinal Caries.

Thorburn	17	2	1	4	2	5	3
Lloyd	128	21	36	37	16		18

Lloyd, in 1902, published an account of 128 cases—abstracted from the literature, and therefore possibly unduly favourable. They are

not so good, however, as Thorburn's results, drawn from his own personal cases. It will be observed that the mortality, immediate and remote is about 44 per cent in Lloyd's series, but less than 20 per cent in Thorburn's. Those cured amount to about one-quarter of the whole; with those improved, the proportion is brought up to one-third. It must be remembered that Thorburn and most other surgeons only operate on bad cases, after six months' rest has failed.

4. **Prognosis when Psoas Abscess is Present.**—As stated elsewhere (*see* PSOAS ABSCESS), cases of psoas abscess recover, die, or become chronic invalids in about equal proportions.

Summary.—We may take it that good social position and proper treatment commenced early are very important; that the mortality is about 5 to 10 per cent; that about 80 to 90 per cent recover in early, well-treated cases in favourable surroundings; but that taking the average of all cases, it is probably only about half that do so; that of paraplegic cases, three out of four recover with prolonged rest and extension, but if this fails, laminectomy will relieve or cure about a third of those operated on—the mortality of this operation, immediate and remote, may be 40 per cent.

REFERENCES.—Tubby, *Deformities, including Diseases of Bones and Joints*, vol. ii, 1912; Thorburn, "Spinal Cord," *Burghard's System of Operative Surgery*; Lloyd, *Philadelph. Med. Ann.* 1902, Feb.; Marsh and Watson, *Diseases of the Joints and Spine*, 1910.

A. Rendle Short.

SPINE, INJURIES OF.—We shall consider the prognosis after injuries of the spine under the following headings: (1) *No evidence of fracture, dislocation, or gross injury of the spinal cord*; (2) *Fractured or dislocated spine, with or without involvement of the cord, apart from operative treatment*; (3) *The value of operative treatment*; (4) *Gunshot and other wounds of the spine.*

1. **Cases without Evidence of Fracture, Dislocation, or Gross Injury of the Spinal Cord.**—It is notoriously difficult to arrive at an accurate diagnosis and prognosis in this class of injuries, and much litigation and cross-swearing of medical witnesses is the consequence. "Say it's your back, Bill; the doctors can't never get round your back": so runs the classical advice given by a workman to his injured mate.

In the great majority of cases, sprains, wrenches, or contusions of the spine, without evidence of bone or nerve injury, improve quickly, and the patient is well in a month or two. There are, however, three groups of symptoms which make the outlook much less favourable.

First, we have to consider the possibility of the onset of *tuberculosis*. Undoubtedly this is a very rare sequel; if a hundred cases of spinal injury were followed up, it is not likely that any would show it; but, on the other hand, patients with caries of the spine do often date it from an injury. The best evidence of the onset of tuberculosis following a trauma will be abscess formation, angular curvature, or skiagraphic evidence of excavation of the bones.

Second, it is quite common for patients, especially workmen seeking compensation, to complain of *persistent stiffness and pain* in the back, often with a tender spot, for months or years after the accident, and the physical examination may reveal nothing at all. It is usually a matter of the greatest difficulty to make a proper distinction between fraud, subconscious exaggeration, fear of being hurt, and genuine pain due to adhesions, in these cases. Sometimes it is rather by detective than medical methods that a correct opinion is arrived at, as for instance by noticing how readily the patient can stoop to pick up anything when it thinks that he is not being observed. When he is lying down on his back, he may be asked to sit up, and also to flex the thighs on the abdomen, while the surgeon observes whether by these means the normal hollow of the lumbar spine is straightened out. If it is, there cannot be any serious disease present. When a patient is holding his back stiff voluntarily, it can usually be detected by keeping him stooping several minutes with the flat hand over the painful part; there will be a sudden 'give' when the muscle tires.

When the pain and stiffness are due to adhesions, sometimes a cure can be obtained by forcible flexion under an anæsthetic, followed by movements and massage. In many cases recovery is rapid when a financial settlement has been arrived at and the patient has a strong motive to get well.

There are certain other evidences of organic disease, carrying with it of necessity the probability of long, if not permanent, disablement. By firm pressure with oiled fingers, one may be able to detect little nodular thickenings in the deep muscles if they are at fault. Firm prolonged massage helps to cure such cases. Again, there is a group of cases suffering from a shearing or compression fracture of the bodies of the lumbar vertebræ, less commonly of the cervical and dorsal, shown by the skiagram, and by the development of a slight degree of angular deformity. It will be necessary for the patient to rest in bed for many months, and lead a quiet life for a long time afterwards, before he can be expected to go about his work free from pain, and some permanent disability is very probable.

Third, we have to take into account the condition called *traumatic neurasthenia or hysteria, 'concussion' of the spine*, or '*railway spine*,' with its protean manifestations. This is something more than the persistent pain and stiffness just described; these are usually present and well marked, but in addition there may be a condition of extreme nervous prostration, coming on a few days or weeks after the accident, not usually at once. Sleep is bad, and the patient is very feeble, and lives in terror of paralysis. This is traumatic neurasthenia.

Less commonly, one finds a remarkable simulation of organic disease. There may be areas of complete anæsthesia, having the sock or stocking distribution, and perhaps extreme hyperæsthesia just above the insensitive region. Paralysis, with exaggeration of knee-jerks, may be present, and sometimes retention of urine. This is traumatic hysteria.

The real difficulty is introduced into these cases by the fact that there are a few cases on record of genuine nervous lesions apparently due to an injury to the back, but coming on very slowly afterwards, persisting throughout life, or ending fatally. Several examples are quoted in the third edition of Osler's *Principles and Practice of Medicine*. The following case came under the writer's notice. A gentleman fell from a horse and sustained a blow on the back (not head). For several weeks he was apparently fairly well, though a good deal shaken and neurasthenic; then gradually-increasing weakness of the legs came on, and after some months he became unconscious and died. The autopsy showed a chronic cerebral hæmorrhage, apparently by contre-coup. In other recorded cases there has been pachymeningitis, or degeneration of the tracts.

The prognosis in cases of apparent traumatic neurasthenia and hysteria must take these rare sequences into account, and a careful search must be made for the stigmata of organic disease. If any one of the following is present, the prospect of cure is very uncertain: optic atrophy, optic neuritis, *marked* muscular wasting, reaction of degeneration, absent knee-jerks, extensor plantar response, anæsthesia confined to the anatomical distribution of a nerve or spinal segment, incontinence of urine or fæces. Trophic lesions, unless artificial, and ankle-clonus are suspicious of organic disease, but not conclusive.

If evidence of gross changes cannot be found, the patient will almost certainly recover, but it may be a long business. Traumatic hysteria is much more amenable than traumatic neurasthenia. Settlement of any financial or compensation claim usually leads to rapid improvement, and this must not be interpreted to mean that the patient was shamming. Given such settlement, the traumatic neuroses are usually well within a year; but it must be admitted that in a few cases, even where there is no question of compensation, the patient's courage and morale appear to be permanently impaired.

2. **Fracture or Dislocation of the Spine, apart from Operation.** In general, a fracture or dislocation of the spine leads to crushing of the spinal cord, paralysis, anæsthesia, and sphincter troubles. If the injury is high up, death results within a few hours or days, from interference with breathing; if above the fourth cervical vertebra, the patient usually dies on the spot. If the fracture is low down, the patient may linger in a pitiful condition for months, sometimes as long as two or three years, and dies at last of cystitis leading to surgical kidney, bedsores, or bronchitis. Much depends on the care with which he is looked after. Degenerative changes, sometimes called 'myelitis,' appear to take place sooner or later in a spinal cord which has been crushed severely, and these changes may spread up towards the brain.

Burrell has published a record, unfortunately not very well classified, of 244 cases of fractured spine admitted to the Boston City Hospital during forty-two years. He does not furnish separate figures for those patients, 13 per cent of the whole, who displayed no

paralysis, nor for the cases operated on. Of the 244 cases, about two-thirds died in hospital. Period when deaths took place:

Under five days -	65·7 per cent
Five to ten days	8·6 "
Ten to thirty days -	12·4
Later - - -	13·3
	100·0

Of the 'recoveries' (that is, sent out of hospital still alive), 62 per cent were 'useful,' and 38 per cent 'useless.' Therefore, of 100 cases, two-thirds die within a month or two, one-fifth recover sufficiently to get about, and the remainder linger in a helpless condition. More than half of the 'useful' recoveries had never been paralyzed. Apparently about 7 per cent of the 244 patients who were originally paralyzed obtained 'useful' recovery.

Classifying the results according to the region affected:

Cervical - -	85·7	per cent died in hospital
Upper dorsal	76·7	" " "
Lower dorsal - -	56·1	" " "
Lumbar - -	50	" "

We turn now from the darker to the more favourable picture, and consider what are the cases that recover.

Concussion of the Cord.—There are undoubtedly patients, of which the writer has seen one, who, with or without a bony injury to the spinal column, are completely paralyzed and anæsthetic up to the umbilicus when first seen, and yet they recover perfectly within a few hours or days. Corner relates five such: in all there was evidence of fracture or dislocation. Some recovered power and sensation within twenty minutes. In a sixth case, the patient, an old man, kicked in the back by a horse, was completely paralyzed and anæsthetic, and died in two days; but at the autopsy there was no sign of injury either to the spine or cord. The patient seen by the writer was admitted with complete loss of power and sensation, coming on instantly at the time of the blow; but he was well enough to walk home in a week! It does not appear to be possible to tell on first seeing the patient whether his paralysis is due to concussion or to gross organic destruction; but if the distributions of the anæsthesia, the paralysis, and the bony injury do not coincide, there is good hope that there is an element of concussion in the case. If recovery is going to take place, it will do so within a week, and usually there is great improvement within a day or two. Not uncommonly there is a combination of concussion and organic mischief, and recovery will only be partial in consequence.

Fracture or Dislocation of the Cervical Spine used to be considered a necessarily fatal injury; but since the introduction of skiagraphy many cases have been observed, of which the writer can recollect seeing four, in which recovery took place, though some pain and

stiffness of the neck remained. Fritzsche collected from the literature up to 1912 as many as 40 cases of fracture of the odontoid process; 27 died and 13 recovered. Boeckel has furnished a monograph on fractures and dislocations of the neck, showing that the best results are to be obtained, when the cord is not pressed on, by immediate reduction under chloroform, or, better, by continuous extension; if nothing is done there is danger of sudden fatal nipping of the cord. If paralysis is already present, laminectomy is the only hope.

Unilateral dislocation of the neck is particularly favourable in that the cord often escapes involvement, and reduction can generally be effected.

Hæmorrhage into the Spinal Cord or Membranes.—This may come on at once or within a few hours of the accident, and is so far favourable in that some degree of recovery usually occurs, though it may not be complete. Signs suggesting hæmorrhage are: (1) The onset or spread of paralysis after a few hours; (2) The development of the syringomyelia complex—loss of pain and temperature sense whilst tactile persists—indicating a central hæmorrhage; the writer has seen a case; (3) Spasms, cramps, and hyperæsthesia, due to extradural bleeding.

Injury of the Cauda Equina.—Regeneration, sufficient to be of functional value, does not occur in the central nervous system, but it may take place in the cauda equina, either after operation and suturing any divided roots, or spontaneously. Recovery, apart from operation, is not likely to be complete unless the involvement of the roots was very partial. The writer has seen very considerable improvement take place in a month, but not sufficient to make walking possible.

In general terms, then, it may be stated that if recovery is going to occur spontaneously after an injury to the spine with paralysis, there will be marked improvement in a month, and usually in a fortnight. After this, there is little or no hope of further benefit. The most important sign is the degree of muscular wasting. If this is marked, the case is hopeless. Severe trophic lesions, such as bedsores, are also a bad sign.

It must be borne in mind that, in cases of fractured or dislocated spine in which the cord has escaped, great care must be exercised for months, or the bones may slip and nip it. Burrell relates an instructive example of this.

3. **The Value of Laminectomy.**—In the great majority of cases of fractured spine, the cord is completely nipped at the moment of the accident, and nothing will ever restore it. This unfortunate fact dominates the situation. Neither in man nor in animals does functional restoration occur after suture, although Marinesco and others have demonstrated some histological regeneration of fibres. Nevertheless, realizing the hopelessness of the situation in many cases apart from operation, the surgeon is often tempted to employ it as a last chance.

The *mortality* of the operation itself is not high. Thorburn had 3 deaths in 49 cases under his own care, including, however, laminectomy for all sorts of conditions; he lost none of the 16 patients on whom he operated for injury after the lapse of some weeks. In Lloyd's series of cases from the literature up to 1901, the mortality of the immediate operation was 48 out of 82, or 57 per cent, and of the late operation 11 out of 103, or about 11 per cent. These statistics need correcting: being literature records, they may be too good; but as they go far back, they may be too bad. We may probably conclude that the mortality of the early operation is high, and of the late operation about 5 to 10 per cent. Care must be taken to avoid infection, especially if the patient has incontinence.

STATISTICS OF LAMINECTOMY FOR FRACTURED SPINE (LLOYD, 1909).

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Died early	21	2	23	5	4	4	0	0
Recovery	0	2	4	10	1	6	0	1
Improvement	2	1	9	18	1	6	0	3
No improvement	0	4	6	16	0	4	0	0
Died later	4	3	7	16	0	2	0	0
Total	27	12	49	65	6	22	0	4

SUMMARY.

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Immediate operation	82	48	5	12	6	11
Late operation	103	11	19	28	24	21

When we inquire concerning the *end-results*, the records are not very promising. Thorburn himself operated 5 times within a day or two of the accident, but none of the patients were benefited; he collected records of 200 more cases, without finding evidence that any were improved by the operation. Some, it is true, did get better, but they might equally well have done so without interference.

Lloyd, from his study of the literature, found that out of 83 cases operated on early, only 5 could be described as more or less cured, and 12 improved: it is not possible to say how much better they would have got without operation, but the figures do not compare well with those of the non-operated series, where one-fifth obtained

useful' recovery. Except in a few urgent cases, such as those with pressure on the cervical cord, early operation is not to be advised.

The late operation, usually a month or six weeks after the accident, gives better results in well-chosen cases. The immediate risk is much less, and as by this time it is evident how much or how little one may expect from nature, any improvement resulting is more certainly due to the operation. Thorburn has performed 16 laminectomies under these circumstances, with 4 cures, 7 improved, and 5 no better. In Lloyd's series, nearly one-fifth are described as having recovered, and one-fourth improved. Unfortunately, mere improvement is not of much use to these patients, unless they are able to stand or walk. In the majority of cases no benefit was conferred.

Nevertheless, it is evident that in a few picked cases considerable good may be done. Exactly which these cases are is shown less by the statistics than by experience and by a few isolated reports. Laminectomy may do good in the following classes:

a. Fracture or dislocation of the neck with pressure on the cord, where death stares the patient in the face.

b. Pressure on the cauda equina, because in the nerve-roots degeneration is possible. Thorburn advises delay for six weeks to see what spontaneous recovery will do, and quotes a case of Tuffier's, in which complete cure followed laminectomy and suturing.

c. Depressed fracture of a lamina, which can be removed. Schede obtained complete recovery in such a case, although when first seen the patient was quite paralyzed and anæsthetic. Other surgeons have not had such happy results.

d. Cases of hæmorrhage into the membranes.

e. Cases in which retention, or exaggeration of the reflexes, shows that the functional continuity of the cord is not destroyed, but that it may be suffering injurious pressure.

4. **Gunshot and Other Wounds of the Cord** (*see* GUNSHOT WOUNDS, p. 291).

REFERENCES.—Lloyd, *Jour. Amer. Med. Assoc.* 1901, 1014, 1111, 1247; Thorburn, 'Injuries of the Spine,' *Burghard's System of Operative Surgery*; Lotzsche, *Deut. Zeits. f. Chir.* 1912, 7; Boeckel, *Rev. de Chir.* 1911, 285; Corner, *Lancet*, 1906, ii, 784; Burrell, *Ann. Surg.* 1905, xlii, 481; McKendrick, *Injuries of the Back*, 1916.

A. Rendle Short.

SPINE, TUMOURS OF.—We shall include under this heading growths of the vertebral column, and also of the spinal cord.

Tumours of the Vertebral Column.—Growths arising in the bony spine are almost invariably malignant, either primary sarcoma or secondary carcinoma. At first they are likely to be confused with an early case of tuberculosis of the spine, presenting only pain and localized rigidity, without abscess formation or angular deformity. The skiagram may be helpful, and especially a history of carcinoma elsewhere.

When the diagnosis is established, the prognosis is practically

hopeless. After a few months of great pain and helplessness, the patients die. The cord may eventually be pressed on.

Hydatid disease of the lumbar vertebræ may simulate tumour, and in this case a successful result may follow operation. Of five cases of hydatid disease of the spine treated by operation at the Queen Square Hospital, all have done well.

Tumours of the Spinal Cord.—The diagnosis of these cases usually rests upon progressive signs of paralysis, anæsthesia, and sphincter trouble due to pressure on the cord, associated with severe pain, and in many cases the symptoms are at first unilateral. As it is difficult or impossible to make a clinical distinction between the signs of spinal-cord tumour and those of localized or diffuse spinal serous meningitis, these are taken together.

Apart from operation, the cases are always fatal within a few years. The average duration of life is said to be sixteen months (Starr) to two years (D. Armour), but a few go on for several years. Rarely, iodides improve matters somewhat. There is generally a steady progress from root pains to pressure on the cord, then to sphincter troubles, cystitis, bedsores, etc.

Treatment by Operation.—Although tumours of the spinal cord are not so common as tumours of the brain, the results of treatment are much more satisfactory. All observers agree that sarcoma is the type of growth most frequently met with, but if the microscopical diagnosis is to be relied upon, sarcoma in this situation must be of a very benign type, because recurrence is the exception, not the rule.

The *operation mortality* is not very serious at the present day. The general death-rate of the operation of laminectomy for all causes is given by Thorburn, as the result of 49 cases in his own practice, as 6 per cent.

The following table gives the mortality of laminectomy for tumour:

TUMOURS OF THE SPINAL CORD. OPERATION MORTALITY.

Thorburn (personal) - - -	6	0
Von Eiselsberg and Ranzi - -	17	2
Hunt and Woolsey - - -	7	1
Harte (from the literature) - -	92	26
Potel and Veaudeau (literature) -	55	19
Total -	177	48

When followed for a long period, 17 more of Harte's series died, but his figures could probably be improved upon at the present day: the true mortality may be between 10 and 20 per cent. About half

the cases seen are suitable for removal; of the remainder some growths start in bone, others are very extensive, or the cord is already destroyed.

The *end-results* are very satisfactory. R. T. Williamson, by picking successful cases out of the literature, is able to give details of 51 patients, 17 of them having had a sarcomatous tumour, in whom practically complete recovery took place; that is, they were all able to walk, but a few still showed some spasticity or ataxia.

The following table gives the end-results in a few small series:

TUMOURS OF THE SPINAL CORD, END-RESULTS OF OPERATION.

Thorburn	6	5	1	0	0
Von Eiselsberg and Ranzi	10	3	6	1	0
Hunt and Woolsey	5	3	0	0	2
Harte (from literature)	49	29	17	3	
Total	70	40	24	4	2

Thorburn records 6 cases from his own practice, of which 5 were well enough to go back to work.

In von Eiselsberg's series, in 3 cases no tumour was found: 2 of these were improved, and 1 was not improved.

Hunt and Woolsey relate 5 cases; 1 recurred and had a second operation four years later, but has since remained well for years; another recurred a year after operation. The other 3 were well three to five years after operation.

Harte's series, drawn from a study of the literature up to 1905, does not show how long the cases were followed, nor how many recurred, but he states that many cases, even of sarcoma, were well years afterwards. Out of 37 patients with sarcomatous tumours of the cord, 20 died, 8 were cured, 7 improved, and 2 no better. In 12 of his cases only adhesions or cysts were found.

We may conclude then, that about half the cases of tumour of the spinal cord are operable; that the operation mortality is about 10 to 20 per cent; of patients recovering from the operation, two-thirds are cured, and only about one in ten fails to benefit or relapses; and that sarcoma in this situation is remarkably benign.

REFERENCES.—R. T. Williamson, *Diseases of the Spinal Cord*, 1911; Thorburn, "Spinal Cord," *Burghard's System of Operative Surgery*; Von Eiselsberg and Ranzi, *Arch. f. klin. Chir.* 1913, 309; Hunt and Woolsey, *Ann. Surg.* 1910, lii, 289; Harte, *Ann. Surg.* 1905, xlii, 524.

A. Rendle Short.

SPLEEN, INJURIES OF.—(*See* ABDOMEN, INJURIES.)

SPLENIC ANÆMIA.—(*See* ANÆMIA, SPLENIC.)

SPLENOMEGALIC POLYCYTHÆMIA.—*(See* Polycythæmia.*)*

SPRAINS. *(See* Joints, Injuries of.*)*

SPRUE. Sprue is a very chronic disease as a rule, with great tendency to relapse after apparent cure, so it is difficult to obtain accurate figures regarding its mortality. An analysis of 50 cases in the Calcutta European Hospital showed only 2 as cleared as "cured," of whom at least one relapsed. Only 6 died in hospital, 5 of whom were between the fifth and twelfth month of the disease out of 18 in that stage, which is therefore the most deadly period. Only 1 of 12 cases of over one year's duration died in hospital, so the more chronic cases have a better prognosis. None died during the first six months of the disease. On the other hand, only 3 of the 45 cases were much better when discharged, while 26, or 57·7 per cent, were no better, mostly after prolonged treatment, so had little chance of recovery, and the prognosis of the disease is therefore very grave. Many patients who return to the tropics after having been "cured" by santonin and other treatment during a prolonged stay in Europe, soon relapse, and some die of the disease. The most deadly complication is pernicious anæmia, which may carry off the patient within a few weeks.

Unfavourable signs are extreme emaciation, advanced anæmia, increased frequency of the stools maintained over a long period, and extreme soreness of the mouth interfering with feeding. Too early, and especially sudden, great changes in the diet may cause a relapse or precipitate a fatal termination.

Steady gain in weight and improvement in the consistency and colour of the stools are the most favourable signs; but extreme caution is necessary in adding to the diet. No drug has any specific action in the disease, the effect of yellow santonin being very temporary when not accompanied by change to a cool and bracing climate, which itself has the greatest curative action. Rogers has recorded recoveries in the tropics by treatment with an autogenous mouth streptococcus vaccine, but confirmation by others is lacking.

Leonard R

STILL'S DISEASE.—*(See* Arthritis Deformans.*)*

STOMACH, MEDICAL AFFECTIONS OF.

Acute Gastritis.—The prognosis depends very greatly on the cause and intensity of the catarrh. If due to microbic causes the gastric symptoms may only be the local manifestations of a general disease such as enteric fever.

Uncomplicated acute gastric catarrh is generally well in a few days, but may last for a week or longer.

Toxic Gastritis, i.e., the gastritis produced by the ingestion of various poisonous substances such as concentrated acids and alkalies, arsenic, phosphorus, perchloride of mercury, and so on.—The prognosis in each case depends on the amount taken, the concentration, and the

particular poisonous action of each substance. A fatal result may occur in two or three hours, the patient becoming exhausted, with cadaverised respiration, and dying with convulsions, collapse, or coma. On the other hand, he may die in a few days from perforation and peritonitis, or later on from remote effects and sequelæ of the œsophagus, stomach, or pylorus. Lastly, he may die from the poisonous effects of the particular substance taken.

Chronic Gastritis. Before any definite prognosis can be given in chronic gastritis it is necessary that certain diagnoses should have been made, and the possibility of malignancy or parasites amongst excluded. *Per se* it may last for an indefinite number of years, but some cases are complicated by subsequent cancerous or other organic lesions. In very rare cases a tumour may be felt in simple cirrhosis of the stomach, death eventually being due to asthenia following emaciation and anæmia.

Diffuse Phlegmonous Gastritis is almost certainly always fatal, the course of the disease being less than a week.

Membranous Gastritis, being almost always secondary to some other severe illness, the prognosis depends on that of the primary disease, though not infrequently this complication is a terminal lesion.

Carcinoma. The prognosis depends on the type of the growth, its rate of progress, tendency to ulceration, and the rapidity with which secondary deposits arise. Unless the tumour can be removed by surgical means, death is inevitable. This in very rare cases may be delayed as long as four years, but in the great majority of cases is very much less. An average duration of life after the disease is first diagnosed is about seven or eight months. In very exceptional cases the patient may increase in weight after a preliminary wasting. In one of the writer's cases, a temporary gain in weight of eleven pounds in sixteen days occurred in an emaciated woman the subject of carcinoma. The intensity of the pain is no guide to the prognosis, since it bears no relation to the rate of extension or size of the growth.

It is unusual for hæmatemesis to be the cause of death in carcinoma of the stomach, though this may arise from deep ulceration, or even from involvement of the spleen. The onset of complications due to the invasion of other organs by secondary growths frequently hastens the end. Among the most important of these are jaundice from involvement of the liver or of the glands in the transverse fissure, and ascites from involvement of the peritoneum. Perforation may give rise to general peritonitis, according to some authors, in as many as 5 to 7 per cent of cases. If the growth is surrounded by adhesions, an abscess, sometimes subphrenic, is responsible for the fatal result.

Congenital Hypertrophy of the Pylorus (*see also* PYLORUS, CONGENITAL STENOSIS OF).—About 50 per cent recover without subsequent complications. With an earlier recognition of the disease, the proportion of recoveries will probably be much greater. In Still's series of 27 cases about 50 per cent recovered, 8 after operation and 6 after

medical treatment, which included daily gastric lavage with a weak alkaline solution.

Ulcer. Correct statistics in connection with gastric ulcer are almost impossible to obtain, because of the difficulty of a certain diagnosis. This applies not only to observations made during life, but also to statistical records based on post-mortem investigations, because cicatrices of small ulcers which have healed are readily overlooked, and very slight ulceration may have healed without leaving any scar.

Speaking generally, the prognosis of gastric ulcer treated by thorough and prolonged medical treatment is satisfactory. Statistical figures vary, however, within somewhat wide limits. Leube gave the death-rate as 2·4 per cent in 424 cases, but eventually he brought down his mortality to 0·3 per cent. Lebert gave the mortality as 10 per cent, J. W. Russel as 6·4 per cent, Bulstrode as 18 per cent, Fleiner as 0 per cent in 300 cases, and Weitrand as 0 per cent in 133 cases. Possibly about 6 to 7 per cent of cases perforate into the peritoneal cavity. At the prognosis of this calamity has enormously improved within recent years, owing to the advance of surgical technique. Local abscess, subphrenic or elsewhere, may lead to death by exhaustion, pyæmia, or pylephlebitis. In rare cases, the abscess bursts into the lung, pleura, or pericardium. Probably less than 3 per cent of the cases succumb from haemorrhage, and another 5 to 6 per cent from other causes, including inanition, secondary mechanical deformities, and carcinoma. The mortality from haemorrhage in Lenhartz's series of 295 cases was 1 per cent, and in Ewald's 652 cases 1·2 per cent. Spriggs found that the prognosis with reference both to life and recurrence of haemorrhage was more favourable in patients treated by Lenhartz's method than in those treated by nutrient and saline enemata followed by a graduated milk diet. Relapse is very frequent, and probably occurs in not much less than 30 per cent. After surgical treatment, as after medical, relapse is not infrequent, but the tendency to relapse after any method of treatment is less after the age of thirty than before. Although it is unusual for a patient to die from a single attack of haemorrhage, this occasionally occurs, sometimes so rapidly that the patient succumbs before vomiting takes place. According to Spriggs, the mortality of any large series of cases operated on for haemorrhage is greater than it is in a similar series not operated on.

About 50 per cent of the cases are permanently cured. Anæmia from any cause retards the healing of an ulcer, and a patient with a healed ulcer is always liable to relapse as long as anæmia persists. The percentage of cases of cancer of the stomach which owe their origin to previous ulceration varies in different statistics from 2·3 per cent up to 9 per cent.

Syphilis of the Stomach.—This affection may very closely simulate gastric ulcer or malignant growth. The prognosis, therefore, very largely depends on a correct diagnosis. If this is made early, before the patient is suffering from excessive debility owing to the mechanical

effects of the tumour, or from dense adhesions or peritonitis, the prognosis is decidedly favourable under brisk antisyphilitic treatment. With dense adhesions or formation of scar tissue surgical treatment may be necessary. Profuse hæmorrhage may very exceptionally arise.

Acute Dilatation.—This may cause death in a few hours, with pain, anuria, severe symptoms of collapse, associated with a very copious and rapid secretion into the stomach. A fatal result is not uncommon in spite of energetic treatment and gastric lavage. Sudden dilatation, arising from injudicious feeding during convalescence from prolonged exhausting diseases such as typhoid fever, may lead to immediate death.

Chronic Dilatation.—The outlook depends very much on the cause, the general health of the patient, and the length of time the trouble has existed before treatment is adopted. In atonic dilatation, the course of the illness is frequently very prolonged, running into years, very frequently with incomplete restitution of the normal size of the viscus at the end of lengthy and careful treatment. With mechanical obstruction prognosis is more hopeful, if early surgical treatment is available. Severe forms of gastric dilatation may be associated with tetany, which, if well marked, is of serious significance. This condition has, however, been treated quite successfully by gastro-enterostomy, with subsequent cure of the patient. (With reference to the prognosis of coincident acidosis, see ACIDOSIS.)

A. R. Cushny.

STOMACH, SURGICAL AFFECTIONS OF THE.

Gastric Ulcer.—Our conception of 'gastric ulcer' has entirely changed in recent years: formerly considered easy of diagnosis, it is now known to be difficult, even in long-standing cases. For this reason the prognosis of cases not verified by operation is entirely a matter of conjecture.

Two distinct lesions are included under the term gastric ulcer—the acute ulcer, frequently multiple, called 'mucous' by Sir Bertrand Dawson[1] and the indurated chronic ulcer, usually single.

With regard to the relative frequency of these, we are entirely in the dark. Owing to the recent extension of surgical activity in the upper abdomen, we now know that symptoms which formerly were considered pathognomonic of gastric ulcer often owe their origin to extra-gastric causes, and are entirely removed by treating these.

That chronic gastric ulcer is a serious disease carrying with it a very considerable mortality is now becoming well known.

The results of the medical treatment of patients presenting the symptoms of chronic gastric ulcer have been investigated by several. Among the earliest figures are those given by Bulstrode[2] who compiled statistics of all the cases of 'gastric ulcer' admitted into the London Hospital from January, 1897, to August, 1902. These numbered 500, 402 women and 98 men. Of these cases, 42 per cent had had previous attacks. The death-rate was 18 per cent: 10 per cent from perforation, 2½ per cent from hæmatemesis, 5½ per cent from other causes.

These figures did not include late results such as pyloric stenosis, hour-glass contraction, etc.

That the mortality rate is unreliable and much too low is evident from the sex relationship: 102 women and 98 men. The conditions which mimic chronic gastric ulcer are more common in the female sex and rarely fatal.

Of the 317 cases of gastric ulcer upon whom I have operated, 204 were males. This is in accord with the experience of other surgeons.

Habershon's figures give a more correct idea of the death rate in cases of chronic gastric ulcer treated. Of 60 cases in private practice there were 24 deaths: 16 males (6 perforation, 7 haematemesis, 3 exhaustion) and 8 females (5 perforation, 3 haematemesis).

MacNeven and Herrick's figures are instructive. Among 55 fatal cases of gastric ulcer examined post mortem, 25 had died of haematemesis (19 males, 6 females), 30 of perforation (8 males, 22 females).

Greenhough and Jessup published the results of the medical treatment of 187 cases: the mortality was 8 per cent. After five years, 115 patients could be traced: 57 had had recurrence, and 15 had died of gastric disease.

Figures based upon the medical diagnosis of gastric ulcer, although minimizing the fatal risks, show very strongly the futility of medical treatment in the majority of the cases.

It is evident from the discrepancies between the sex distribution in the medical and surgical statistics that there are two distinct conditions: one more common in women, in which acute ulceration followed by perforation may occur; the other more frequent in men, in which the immediate cause of death is not uncommonly haematemesis. In this group perforation is uncommon.

The cases formerly diagnosed gastric ulcer in young women are usually examples of extra-gastric disease with, in many cases, acute gastritis or mucous ulcers the result of septic infection. The relation between the two groups is at present obscure, but it seems certain from the sex incidence of chronic lesions, that in the majority of cases, although symptoms resembling chronic gastric ulcer does not follow Careful medical treatment of this group of cases, if the condition causing the gastric disturbance—septic teeth or chronic constipation—can be dealt with, as successful treatment of disease of the gall-bladder or the appendix is responsible, treatment of these alone will cure.

In chronic gastric ulcer, in relation to the dangers from haemorrhage, perforation, and malnutrition the result of stricture, there is the apprehension of the development of carcinoma. Considerable difference of opinion exists with regard to the frequency with which this occurs.

The most widely-quoted figures are those of Wilson and MacCarty, obtained as a result of their examination of specimens removed by operation in the Mayo clinic. In 109 out of 153 cases (71 per cent.) there was evidence that malignant disease had supervened on chronic gastric ulcer.

On the other hand, in 72 consecutive cases in which I have excised chronic gastric ulcers, diagnosed at operation as simple, I have had final sections examined microscopically, and in two only was any trace of malignant development perceptible.

Bunge recorded 24 cases of excision of chronic gastric ulcers, in 6 of which microscopic examination revealed early malignancy.

Looking at the subject from the clinical standpoint, I have operated upon 189 cases of gastric carcinoma, 67 only of whom were women; this fact is suggestive. In a third of the cases only I obtained a history of gastric disease, on which I should base the diagnosis of chronic gastric ulcer extending over more than five years.

Although the frequency has probably been over-stated, I think there can be no doubt whatever that previous gastric disease is a predisposing cause of carcinoma.

Thorough medical treatment after removal of septic foci during the first attacks of gastric symptoms can be expected to result in cure in 30 to 40 per cent. of the cases. If relapse occurs it is obvious that the exciting cause is beyond medical assistance. If chronic ulcer has developed, medical treatment appears to be a failure in every case.

Perforation.—The prognosis depends upon the time at which operation is carried out. If within twenty-four hours, the death-rate should certainly be below 10 per cent. The older figures, which are widely quoted, are much too high. Gross and Gross found the death-rate of operation in collected cases within the first twenty-four hours to be 59 per cent., and within the first twelve 25 per cent., a figure which agrees closely with those given by Brunner; these closely correspond with the personal figures of Miles in 1906: 19 cases within twelve hours of operation, 26·3 per cent. mortality; 9 cases between twelve and twenty-four hours, 44·4 per cent. mortality. Sinclair Kirk has recorded a series of 11 cases operated on, 10 before the twelfth hour, and 1 at twenty hours, with recovery in all. Of 13 cases upon whom I have operated within the first twenty-four hours, all recovered. On the other hand, in 23 cases over this period, there were 12 deaths.

The immediate result of operation in these cases is excellent, but a certain number suffer later from dyspeptic symptoms similar to those from which the majority suffered before perforation. There is, however, considerable difference of opinion with regard to this. Hale White said: "Judging from our results at Guy's Hospital, it appears that patients who survive an operation for perforated gastric ulcer do so well that a gastro-jejunostomy is quite unnecessary." This is, however, not the experience of surgeons of the world; "operation" is used instead of gastro-jejunostomy.

Paterson found that 25 per cent. of patients relapse within 3 years of operation.

It is obvious that as the ulcer which perforates is a chronic one in most, a small proportion of cases, the continuance of the symptoms depends upon extra-gastric causes.

If the ulcer which perforates is a chronic one, gastrojejunostomy should be done at the time of closure of the perforation, if the condition of the patient will allow. This I was able to carry out in 8 cases who have had no further return of symptoms. Five of the remaining patients who recovered have had symptoms necessitating further operation.

Prolonged medical treatment in those cases in which gastrojejunostomy is not carried out, will still further lower the number of cases requiring further operation.

Hæmatemesis.—Dr. Cecil Wall[11] found that 6 per cent of the men and 12 per cent of the women who were admitted to the London Hospital suffering from chronic gastric ulcer, diagnosed clinically, died of this complication. The death-rate is far in excess of this, for included are many cases which were certainly not chronic gastric ulcer. This is shown by all reports of post-mortems, while hæmatemesis is undoubtedly more common in women than in men. Thus MacNevin and Herrick found hæmatemesis to be the cause of death in 25 out of 55 cases of chronic gastric ulcer which came to post-mortem. Of these, 19 were males, and of the women, all except one were over thirty. These figures correspond to my operative experience that chronic gastric ulcer is three times as common in men as in women.

The prognosis of the hæmatemesis of young women is extremely good: the death-rate is less than 5 per cent. I believe that life cannot be saved in this condition by operation. The bleeding often takes place from many foci, and continues unchecked in spite of gastrojejunostomy.

I believe the death-rate from hæmatemesis in chronic gastric ulcer is over 50 per cent. If treated surgically as soon as possible after the first hæmorrhage, the outlook is good. Operation consists in directly controlling the source of hæmorrhage by excision of the ulcer or tying the vessels on either side, combined with inversion and gastrojejunostomy if necessary.

I have treated 15 cases in this way with 2 deaths. On the other hand, death occurred in three patients whom I had seen and who had refused operation, recurrence of bleeding proving fatal.

Operation as soon as possible after the first hæmorrhage—this is usually within twenty-four hours in all cases of chronic gastric ulcer will render the prognosis favourable.

Chronic Gastric Ulcer.—There is still a difference of opinion with regard to the exact form surgical treatment should take. The immediate risk, if the operation is carried out by one skilled in upper abdominal surgery, is a small one.

Up to June 1, 1917, I had operated upon 276 cases of chronic gastric ulcer uncomplicated by hæmatemesis or perforation, with 10 deaths.

The following were the operations performed (thirty-nine, complicated by hour-glass stomach, are separately tabulated):

Excision alone: 7 cases, 1 death.
Excision and gastroenterostomy: 24 cases, 1 death (this patient had urethral stricture and cystitis, and died a month later from this cause).
Partial gastrectomy: 32 cases, 3 deaths (1 from acute gastric dilatation, 1 from pulmonary embolism, 1 from pneumonia). These cases treated by partial gastrectomy were all patients in whom the ulcer had perforated, its floor being formed of pancreas or liver, or in which there were suspicions of malignancy.
Gastroenterostomy alone: 174 cases, 3 deaths (2 from pneumonia, 1 from hæmatemesis, the result of erosion of the splenic artery).

In the 39 cases of hour-glass stomach the following were the operations carried out:

Posterior no-loop gastroenterostomy: 13 cases, no death.
Anterior no-loop gastroenterostomy: 6 cases, 1 death (twelve days later—no attempt at union).
Double gastroenterostomy: 4 cases, no death.
Modified Roux's operation: 2 cases, no death.
Partial gastrectomy: 14 cases, 1 death (twenty-four hours later—at the post-mortem no cause could be discovered). In all the cases in which partial gastrectomy was performed, the floor of the ulcer was formed by the pancreas.

W. J. Mayo[4] records 128 cases of chronic ulcer of the stomach operated on at the Mayo clinic, with a mortality of 2·4 per cent.

It is obvious that the immediate mortality is much less than that even in any series of cases medically treated.

With regard to the remote results of surgical treatment, it is undoubted that the majority of patients with chronic gastric ulcer, wherever situated, are cured as the result of gastroenterostomy alone. The following are representative figures of the results of cases operated upon over two years:

Scotch, 160 cases, followed over two years, 125 remain quite well. 4 were re-operated on and ulcers adherent to pancreas excised, and in 2 cases gastrocolical ulcers excised. The remainder, with one exception, were relieved.
Paterson[5]: After history of 143 collected cases, 82 per cent over two years' duration.
Petren,[6] 157 collected cases, 53 per cent cures, 78 per cent very much better.
Basch,[7] 64 cases, 85 per cent cures.
Kocher,[8] 67 per cent cures, 89 per cent a good result.

It is obvious from these figures that while gastroenterostomy alone will bring about a cure in probably 70 per cent, and give relief in another 10 or 15 per cent, there is yet a margin in which further improvement is desirable.

In many of the recorded results, the cause of the continuance or recurrence of symptoms has not been noted, and it may be that they are due to other conditions overlooked at the first operation. In one of my cases the recurrence of symptoms—as due to gall-stones—subsequent operation proved that the ulcers had healed.

Thorough examination of the whole alimentary tract, and gastrojejunostomy combined with excision of resection in suitable cases, will still improve our results and bring about a lasting cure in over 95 per cent. of the cases of chronic gastric ulcer, with a death-rate of less than 5 per cent.

Much discussion has taken place with regard to the correct operative procedure, but no hard and fast rule can be laid down. Cases of chronic gastric ulcer [illegible] should be treated by [illegible] operation. The decision must be made in each case after the abdomen has been opened.

In the exceptional cases of posterior ulcer causing the pancreas, the best is the result of gastrojejunostomy, and should be treated by partial gastrectomy.

Excision alone per [illegible] Busch[illegible] in 12 cases, found 2 in which gastrojejunostomy was necessary later. Dobson[illegible] in 16 cases, had to operate for recurrence in 4, in 2 of which the appendix had been removed at the original operation. In my series of the 6 survivors of 10 cases treated by excision alone I was able to trace 5. I have since operated on all for recurrence of ulceration. It is convenient that excision alone is not liable.

Hemorrhage and perforation have been recorded after gastrojejunostomy. These complications may be avoided by treating the ulcer directly, either inverting it or its posterior adherent ulcers, performing excision or resection combined with gastrojejunostomy. In the patient of mine [illegible] death took place from hemorrhage, I should, at the present [illegible] have excised the ulcer.

It has been pleaded in favour of excision in every case that malignant disease may supervene, and that it is impossible to tell if this has already taken place. Küttner states that 5 out of 12 patients (41 per cent.) died of cancer of the stomach, and that 43 per cent. of ulcers excised were malignant. Busch, on the other hand, draws attention to the small percentage of cases in which this occurs. In 3 of my cases carcinoma of the stomach was the probable cause of death after seven, five and four years of perfect health. In only the last case am I certain that the cause of death was carcinoma of the stomach. In the other 2 it was certainly a malignant growth of some abdominal organ.

Hour-glass Stomach. The result of treatment in the 37 survivors has been good. At 8 it one stomach perfectly well, 12 more than three years, 21 over two years.

Von Eiselsberg records 181 collected cases. Of these, 73 were treated by gastroenterostomy, with 11 deaths, four of which were due to an error in technique. The gastrostomy is being made to the pyloric pouch, and to the constriction. Of the 58 survivors, 57 were cured.

Duodenal Ulcer. In duodenal ulcer, medical treatment after the first attack is not only futile but dangerous. Dietary is not to be contemplated. The danger of perforation is great, and frequently occurs between attacks when the patient is free from symptoms and apparently well. Perforation of a chronic gastric ulcer is [illegible] of a chronic duodenal one frequent. Perforation of an acute duodenal

ulcer is rare; it occurred in only 2 cases out of 34 upon whom I have operated.

The same sex predominance is seen in perforation as in the cases operated on before this has taken place: a very different condition from chronic gastric ulcer. Brunner[23] found in 341 cases of perforated gastric ulcer only 68 men, whereas in the unperforated cases the ratio is 3 men to 1 woman; in the cases of perforated duodenal ulcer, 8 women out of 82, 1 to 10, as in the unperforated cases.

That the danger of perforation in chronic duodenal ulcer is greater than in gastric is evidenced from the figures given by Gruber[24] from post-mortem examination. He found that while 17 per cent of the cases of duodenal ulcer had died of perforation, only 5·6 per cent of the gastrics succumbed, and gives the death-rate of duodenal ulcer as 25·5 per cent, of gastric ulcer 9·8 per cent

Küttner[25] states that the prognosis of duodenal is decidedly less favourable than that of gastric ulcer on account of the frequency of perforation and haemorrhage. He quotes statistics of post-mortems in Hamburg showing that when duodenal ulcer was found post-mortem it was the cause of death in 40 per cent.

Haemorrhage is the same lethal complication as in cases of chronic gastric ulcer.

While malignant disease frequently supervenes in cases of chronic gastric ulcer, this change is rare in duodenal ulcer.

In 360 cases of chronic duodenal ulcer personally operated on before perforation in 1 only had malignant disease supervened after a history pointing to chronic duodenal ulcer extending over many years. Moynihan[26] also has recorded an example in which malignancy supervened after ten years.

No case has been recorded of carcinoma of the duodenum arising after gastrojejunostomy.

Perforation.—If operation is carried out within the first twenty-four hours, the prognosis is extremely good.

Sherren: 34 cases of perforation with 18 recoveries. Of 18 operated upon within the first twenty-four hours, all recovered except 2, one of whom was suffering from advanced genito-urinary and pulmonary tuberculosis. The other was a patient in whom fat necrosis[27] was found at operation, and a perforated ulcer was overlooked.

Mitchell[28] has recorded 16 cases operated upon without a death. Of these cases, 11 were operated upon within twelve hours of perforation, 6 within five hours, 1 each at seventeen and a half, eighteen, [illegible]e, thirty-six, and forty-nine hours after perforation.

Smithers[29] quotes 24 cases with 19 recoveries.

It is evident that operation can be carried out within the first [illegible] hours with a death-rate of less than 5 per cent. In all cases in which a chronic ulcer perforates, gastrojejunostomy should be [illegible] the time of closure of the perforation. This I did in 16 of my cases, only 1 of whom died, the patient mentioned above. Of the cases in which this was not carried out, I have since had to perform

it for recurrence of symptoms. In addition, I have had to treat surgically 9 cases after perforation of a chronic ulcer had been closed by other surgeons and recurrence of symptoms had taken place.

The immediate risk of operation in cases of non-perforating duodenal ulcer is small. Moynihan reports 302 cases operated upon, with 5 deaths.

Sherren: 360 cases, with 9 deaths (3 of these occurred among the 35 patients in whom the operation was an emergency one on account of hæmorrhage; one of these died from a continuance of hæmorrhage, another from pulmonary embolism, and in the third his abdominal wall broke down twelve days later and he died of pneumonia after re-suturing); 2 died of bronchopneumonia; 1 died of pulmonary embolism; in 1 no cause could be discovered at the post-mortem; 1 died of hæmatemesis; 1 died of regurgitant vomiting which developed ten days after operation.

Gastrojejunostomy is followed by cure in at least 80 per cent of the cases.

Of personal cases, 227 have been operated on over two years; I have been able to trace 222; 191 remain perfectly well, or were well until death from another cause more than two years after operation; 9 have been re-operated upon for gastrojejunal or jejunal ulcer; 22 complain of occasional discomfort, but in only 3 of these has it been sufficient to need treatment.

In Moynihan's cases, 82·78 per cent are recorded as cured, and 7 per cent improved.

It is important to see that treatment is carried out for at least three months after operation.

The complication most to be feared after gastrojejunostomy is jejunal ulceration. This may occur at the suture line, when it is termed gastrojejunal, or in the jejunum not far removed from it, the true peptic jejunal ulcer. The former condition is preventable; it is due to the use of unabsorbable sutures. Nothing but catgut should be used in doing the anastomosis. The true jejunal ulcer is situated in most instances on the anterior surface of the distal limb of the jejunum, about 1 in. from the anastomosis. This is rare, and was present in 2 only of my 9 cases; in the remainder the ulceration was due to the outer unabsorbable suture working its way into the stomach. Very occasionally it is proximal: in 58 cases recorded by van Roojen[30] it had this situation in 6 only.

The question of the actual exciting cause of jejunal ulceration is uncertain, but it has undoubtedly an association with hyperchlorhydria, is most often met with in males, and follows operation for chronic duodenal much more frequently than those for chronic gastric ulcer.

As the probable cause of jejunal ulceration is similar to that of the ulcer for which the operation is carried out, it is less likely to occur if a careful search is made at the time of the primary operation and any foci of disease in the abdomen, particularly in the appendix and gall-

bladder. In addition, medical treatment should be carried out for at least three months following operation. In cases in which there is a great increase in acidity, it would be well to investigate the gastric contents from time to time.

The question of the influence of the removal of a diseased appendix upon its incidence has not yet been worked out.

True jejunal ulceration occurs in less than 2 per cent of the cases.

Symptoms usually arise within the first two years; thus, in 66 cases collected by van Rooijen,[30] 44 occurred within the first two years, 27 within the first twelve months.

In Moynihan's cases of chronic duodenal ulcer, jejunal ulcer developed in 2. It is interesting to note that in the 4 cases operated upon by him, all had followed duodenal ulcer.

So far as could be ascertained, no example of jejunal ulcer arose in 745 cases in which gastrojejunostomy was performed for chronic gastric or duodenal ulcer in the Mayo clinic,[31] but there were 2 cases of gastrojejunal ulcer, in one of which, however, Murphy's button had been used, and it was retained in the stomach.

Gastric Symptoms associated with Disease elsewhere in the Abdomen.—There are three groups of cases in which symptoms mimicking gastric or duodenal ulcer may be present: they are due to, or associated with, disease in the ileocæcal region, gall-bladder, and urinary organs.

In the first named the symptoms may be due to disease of the appendix, or to such conditions as interfere with the function of the cæcum, terminal ileum, or ileocæcal valve. It may be difficult before operation to say to which condition the symptoms are due, for they all bear a resemblance to each other. It is usually possible, however, to suggest an appendicular origin, for, as I have pointed out,[32] pain in the right iliac fossa is an accompaniment, not of chronic appendicitis, but of interference with the function of the cæcum.

Examples of true appendicular dyspepsia do well after operation. In 1914 the writer published the results of operation in a series of cases in a paper on the "Relations of Appendicitis to 'Dyspepsia' and Diseases of Stomach and Duodenum."[33] Up to that date I had operated on 81 patients, 46 of whom were men. These were cases operated upon for "indigestion" in whom, after exploration of the upper abdomen, the appendix was removed. In 65 the appendix was of the thin, obliterative, and adherent type; it is interesting to note that this was the type found in 84 out of 106, removed during operation for chronic gastric and duodenal ulcer during this period. I was able to investigate the condition of 52 more than twelve months after operation: 36 were absolutely well, 6 were nearly well, and 2 "better"; 8 were no better, although their symptoms were identical with those cured by the operation.

Further experience has confirmed these results, that about 75 per cent of the cases of this type are cured by removal of the appendix, but some fail to receive any relief, is suggestive of the presence in

these cases of early gastric lesions undiscoverable in the course of the exploration. The paper by Lansdown and Williamson,[34] giving a preliminary report of their pathological investigations, points strongly in this direction.

The cases in which, in addition to indigestion, there is a more or less constant pain in the right iliac fossa, are not usually cured by an operation consisting of removal of the appendix alone.

Many are relieved by aperients, abdominal exercises, and the use of a well-fitting belt; others in addition need the freeing of adhesions, sometimes ileocolostomy with removal of the ascending colon.

The now well-known gastric symptoms associated with gall-stones are *entirely* relieved by operation.

Renal calculus may be the cause of symptoms mimicking gastric, or more often duodenal, ulcer. These entirely disappear after operation.

In a few cases, urinary obstruction, the result of enlargement of the prostate, is associated with gastric symptoms. Operation results in cure.

Gastrojejunostomy has no beneficial effect on any of the above conditions. It is an operation that should be carried out only in the presence of definite organic gastric disease.

Gastroptosis.—The fact that the stomach is lower than normal does not constitute disease. The symptoms associated with this condition are practically confined to the female sex. It must be remembered it is not the stomach only that is prolapsed, nor is it from this organ that symptoms arise in the majority of cases. The patients are of the thin, long-thorax type, and the beginning of the illness is usually constipation. This later becomes associated with irregular gastric symptoms, flatulence, pain at various intervals after food, and occasional vomiting. Neurasthenic symptoms often supervene. In the early days of gastric surgery many of these cases were treated by gastrojejunostomy. Of three treated by myself, all developed bilious vomiting necessitating further operation.

Roysing[35] has put it well: "Gastrojejunostomy . . . is a highly injurious operation, inasmuch as not only do the existing symptoms deteriorate greatly, but an entirely new complex of symptoms also supervene, nausea and gall-vomitings." In eight patients he had to operate again, separate the anastomosis, and restore the parts to their previous condition.

In the cases comprised under this heading the symptoms are by no means always due to the one cause. In a few, gastric symptoms may predominate, and a stenosis of the pylorus by kinking, or a chronic obstruction of the duodenum by the mesenteric vessels, be discovered. In others the symptoms are secondary to change in the ileocæcal region.

Thorough investigation by all modern methods should be carried out, including *x*-ray examination after bismuth meals, in order to discover if there is obstruction in any part of the canal.

In no patient should operative treatment be resorted to until all other measures have failed. Rest in bed, diet, and massage followed by the wearing of an abdominal belt and strict attention to the bowels, will ameliorate many.

Operation on the stomach is contra-indicated except in those rare cases in which pyloric stenosis is produced by kinking. In 3 of these upon whom I performed Finney's gastroduodenostomy, complete cure resulted. In 2 patients in whom there was marked obstruction of the duodenum at the point at which the superior mesenteric vessels crossed it, duodenojejunostomy was followed by cure. This may be the type of case in which it has been recorded that gastrojejunostomy gives relief.

Rovsing[37] is an advocate of gastropexy, combined, if necessary, with colopexy in the majority of cases. His results in 163 cases are as follows: Cure, 50·6 per cent; great improvement, 14·7 per cent; improvement, 11 per cent. These results are excellent. All the cases of gastropexy, however, that have come under my personal observation were no better as the result of gastropexy.

Infantile Pyloric Stenosis (*see also* PYLORUS, CONGENITAL STENOSIS OF).—If untreated or treated late, this condition is almost invariably fatal. Cautley and Dent[7] stated that unless operated upon, all die before reaching the age of four months.

Neurath[38] records 41 cases in infants under a year, all of whom died under medical treatment. On the other hand, Robert Hutchison[39] records 20 cases medically treated with 18 recoveries, and Heubner[40] 21 cases with 19 recoveries.

The collected death-rate after operation is over 40 per cent, although individual surgeons have been more successful. Nicoll[41] has so far obtained the best results from his pyloroplasty combined with pyloric stretching: 13 cases, 11 recoveries.

The best results are to be obtained by systematic medical treatment as soon as symptoms appear. If, in spite of gastric lavage and suitable food, weight is steadily lost and the quantity of curd returned in the wash shows no diminution, surgical treatment should be adopted without delay. This should consist, where possible, of some form of pyloroplasty.

The after-history of the cases treated without operation is not fully known. Maylard,[42] and more recently Barling,[43] have recorded instances in young adults in which the condition found was suggestive of infantile stenosis. The writer has had two cases under his care in which symptoms of dilatation of the stomach in early adult life were associated with a difficulty in feeding in infancy.

Carcinoma of the Stomach. Unless treated by operation, life is rarely prolonged more than twelve months from the appearance of symptoms. The results, both immediate and remote, of the treatment by partial gastrectomy are yearly improving. With regard to the immediate mortality, Deaver and Ashhurst[44] collected 1[illegible] cases of partial gastrectomy with a death-rate of 25 per cent.

The most successful series of cases are those published by W. J. Mayo.[15] The immediate mortality in the last 100 cases was 7 per cent.; in the last 50, 4 per cent. In 863 operations for carcinoma of the stomach, resection was carried out in 307. 36.6 per cent. of the patients are alive and well more than three years after operation, 22 per cent. more than five years.

Lauper[16] records 58 resections with a death-rate of 19 per cent. 12 per cent. of those operated upon survived more than four years; most died within three.

Wolf[17] from Kuttner's clinic reports 135 partial gastrectomies with a death-rate of 22 per cent.; in 16 per cent. of those operated on life was prolonged more than three years.

In 140 from Kocher's clinic[18] 20 per cent. remained well over four years.

Sherren[19] 44 partial gastrectomies, 5 deaths from operation. 16 are still alive, 2 over seven years, 2 over five years, 1 over three years, 2 over two years since operation. Death occurred from recurrence, the earliest three months, the latest thirty months after operation.

Langwill reporting on cases from Card's[20] clinic. In 54 excision, mortality 19 per cent., 8 alive and well at three, ten, eleven, thirteen, fourteen months, five, twelve, and fifteen years.

The percentage of cases suitable for radical operation must vary in every clinic, depending as it does upon the education of the physician to modern surgical doctrines in the area drained by the hospital. It should get higher as time passes. It is roughly, at the present time, from one third to one-fifth.

W. J. Mayo, 307 out of 863.
Card, 59 out of 189.
Poncet "Delore and Lenche" 40 out of 137.
Sherren, 44 out of 189.

Mayo sums up the present outlook as follows: "A patient with a cancer of the stomach which is sufficiently localized to be removed radically has better than a 90 per cent. chance to recover from the operation, better than a 36 per cent. chance of a three-year cure, and at least a 25 per cent. chance of a five-year cure."

When recurrence takes place, the average duration of life is eighteen months, but the quality of that life is much better than if gastro-jejunostomy alone had been done. Comfort is usually given until shortly before death, which does not generally occur from recurrence of growth in the portion of stomach which remains. Recurrence is rare after two years, and if life extends beyond four years is very unusual.

Even the collected cases of Paterson, in 1906, gave a percentage of 15 per cent. out of 79 alive and well more than five years after operation, and 38 per cent. well three years after.

It is always that the outlook in carcinoma of the stomach, if operated upon early, is extremely good. But it is necessary to refer suspicious cases to the surgeon at once. The death-rate of simple

exploration is small: among 84 of my own cases 3 died within forty-eight hours. As a rule, death occurs within three months, and occasionally a period of improvement occurs and all symptoms disappear. Eight such cases have been under my care. In one the symptoms remained in abeyance for eighteen months, in another for fourteen.

Total Gastrectomy.—It is rarely that this operation is indicated in cases of carcinoma of the stomach of the usual type. It is necessary to take into cases in which the disease arises in the fundus or in the small group of cases of plastic linitis (leather-bottle stomach) of the medullary type. The immediate death-rate is higher than that of partial gastrectomy.

Mayo in 7 cases in which an almost complete operation was carried out had 3 operative deaths, and no patient survived two years.

Carcinoma of Cardiac End.—At the present time radical treatment of malignant disease in this situation is not established upon a successful technique. Several cases, however, have been recorded in which the growth was removed and œsophagogastrostomy done. Death occurred in all within a few days. Zaaijer[1] has recently recorded a successful case in which, after the performance of gastrostomy, the growth was removed in two stages.

Palliative Operations in Carcinoma of Stomach.—Gastrojejunostomy is of signal service in the relief of symptoms when the growth is causing pyloric obstruction, and in the rare cases of malignant hour-glass stomach. Its performance should be limited to these, for it affords little or no relief when the growth is not causing mechanical obstruction.

The immediate death-rate is much higher than when the operation is carried out for simple conditions. Thus:—

Pearce Gould and Lenander	87 cases, 26 per cent.
Moynihan up to 1906	46 cases, 14 per cent.
Sachs up to 1913	85 cases, 10 per cent.

The average duration of life is about six months. The longest in my cases was two years, with twenty-two months' absolute comfort, another fifteen months, 2 over a year.

The relief afforded is striking, and the operation certainly one to be recommended. The patients are usually able to resume ordinary life.

Gastrostomy and Jejunostomy.—These operations are not stated on the same plane with gastrojejunostomy. As a routine procedure in inoperable carcinoma of the stomach they are inadvisable. It is one of the operations that must be left to the choice of the patient, remembering that the quantity of life is not good, and that the prospect of artificial feeding is very great to some individuals.

The immediate death-rate of gastrostomy is low. As a rule, life is not prolonged more than six months, usually less.

Jejunostomy in 127 cases collected by Bilroth gave a death-rate of 29 per cent., and the majority lived less than two months.

Sarcoma of Stomach.—There are clinically two types of this disease—one in which the tumour is often round-celled and the symptoms resemble those of carcinoma. The other is when the pedunculated tumour is present, springing usually from the greater curvature. The average duration of life is about fifteen months in the round-celled, twenty-eight months in the pedunculated.

Gossel[illegible] has recently collected 61 cases of sarcoma of stomach treated by operation. Of these 29 were of the pedunculated type, 10 deaths. The longest survival was seven and a half years. Of the fixed type there were 22, 15 were resected, with 5 deaths, 3 patients living one, four, and six years after operation.

The writer has treated by resection 2 cases of the pedunculated type. In 1 already recorded recurrence took place within three months. The other, a boy of fourteen, remains well four years later.

Plastic Linitis (*Carcinoma of stomach*—*Adenomatosis of stomach*—Alexis Thomson). This disease is characterised by a diffuse fibrous thickening of the stomach involving the submucous coat and starting usually in the pyloric region. The condition may be either simple or malignant. The relative frequency of the two types is difficult to estimate, for it may be impossible even after microscopical examination of the stomach to say to which group it belongs. Sections of the stomach may appear simple, yet secondary deposit may be present in the liver. Unrelieved by surgery the disease is uniformly fatal.

Lyle[illegible] in an exhaustive paper bringing the subject up to date, found in 43 cases the average duration of life was forty-nine months (shortest three months, longest twenty years). In 37 of the so-called malignant type, the average was 23·9 months.

He records 25 cases treated by operation: 3 total gastrectomy, 1 well four years later, 13 partial gastrectomies (details of many of these are lacking, but life was prolonged beyond two years in at least 5 cases), 8 gastro-enterostomy—of these there were 4 operative deaths, 1 died four years after operation, cause not known, others were alive and well eight years, four, and three and a half years after operation. There is, in addition, Moynihan's case of complete gastrectomy[illegible] for the malignant type of the disease, in which death occurred four years later.

Jejunostomy: 4 cases—3 died within a few days, 1 is alive and well five years later.

Seven cases have been operated on by the author. To the naked eye, all were typical of this condition. Three were certainly malignant, although in 1 with secondary deposits in the liver, sections of the stomach wall revealed no trace of malignancy. Of these cases, 5 were treated by gastro-jejunostomy—1 is alive and well six years later, and 1 four years later. 1 lived in comfort for a year and died in twenty months. 1 died five months later, 1 died the day following operation.

In 1 patient in whom I performed jejunostomy, life was prolonged in reasonable comfort for four months. Gastrectomy, complete or

partial failure, this gastrojejunostomy allows of prolongation of comfortable life with a prospect of cure.

[illegible] *Brit. Med. Jour.*, 1912, ii, 936; [illegible] *Med. Chir. Trans.*, 1902, [illegible] 86; [illegible] *Diseases of Stomach*, 214; [illegible] *Jour. Med. Res.*, 1909, [illegible] 14; [illegible] *Jour. Med. Sci.*, 1899, cxxix, 167; [illegible] *Jour. Med. Sci.*, 1909; [illegible] *Brit. [illegible] Chir.*, 1911, lxxxii, 638; [illegible] *Rev. de Chir.*, 1904, [illegible] 79; [illegible] *Deut. Zeits. f. Chirurg.*, 1903, lxxx, 178; [illegible] *Med. Jour.*, 1906, [illegible]; [illegible] *Med. Press and Circ.*, 1905, 321; [illegible] *Med. Chir. Trans.*, [illegible] 118; [illegible] *Med. Sci. Trans.*, 1902, xxxvi, 86; [illegible] *Jour. Surg.*, 1911, 313; [illegible] *Med. Chir. Trans.*, [illegible] 110; [illegible] *Rev. de Chir.*, 1904, [illegible]; [illegible] *Lancet*, [illegible] 1910, [illegible]; [illegible] *Deut. Zeits. f. Chir.*, B. 110, Leipzig, 1912, lxx, 226; [illegible] *Lancet*, 1906, [illegible]; [illegible] *Brit. Med. Jour.*, 1912, [illegible]; [illegible] *Zeits. f. Chir. Beihefte*, 1910, No. 31; [illegible] *Rev. de Chir.*, 1905, 265, 403, 561; [illegible] *Deut. Zeits. f. Chir.*, 1903, lxix; [illegible] *Med. [illegible] Gesellsch. f. Med. [illegible] Chir.*, B. [illegible], 1911; [illegible] *Zeits. [illegible] Chir. Beihefte*, 1913, No. 28, 61; [illegible] *Dublin Jour.*, 2nd ed., 42; [illegible] *Med. Press and Circ.*, 1909, 347; [illegible] *Brit. Med. Jour.*, 1909, i, 946; [illegible] *Brit. Med. Jour.*, 1912, ii, 1350; [illegible] *Arch. f. klin. Chir.*, 1910, xci, 480; [illegible] *Surg., Gyn. and Obst.*, 1910, 227; [illegible] *Jour.*, 1913, Sept. 24, xcv; [illegible] *Brit. Jour. Surg.*, 1914, i, No. 3, 390; [illegible] *Ibid.*, ii, No. 6, 306; [illegible] *Jour. Surg.*, 1914, i; [illegible] *Med. Chir. Trans.*, 1903, xxxvi, 151; [illegible] *Brit. Med. Jour.*, [illegible] 929; [illegible] *Gesellsch. f. Chirurg.*; [illegible] *Med. u. Chir.*, 1899, ii, 696; [illegible] *Brit. Med. Jour.*, 1910; [illegible] 1921; [illegible] *Jour. de Chirurgie*, 1909, Oct.; [illegible] *Glasgow Med. Jour.*, [illegible] 254; [illegible] 1910, i, 630; [illegible] *Lancet*, 1911, xxxvii, 67; [illegible] *Lancet*, 1913, [illegible] 231; [illegible] *Jour. Pathology*, xvi, [illegible]; [illegible] *Surg., Gyn. and Obst.*, x, 10, No. 2, 115; [illegible] *Deut. Zeits. f. Chir.*, B. 110, Leipzig, 1912, lxx; [illegible] *Brit. Med. Jour.*, 1913, Mar. 8; [illegible] *Med. [illegible] Gesellsch. f. Med. u. Chir.*, B. xx, heft 3; [illegible] *Med. Jour.*, x, 222; [illegible] *Chirurgie*, 1909, 67; [illegible] *Lancet*, 1913, lxxxiii, 419; [illegible] *Annales de Chirurgie, gynécologie, obst.*, 1909, Nos. 2, 3; [illegible] *Presse Méd.*, 1912, Mar. 16; [illegible] *Brit. Med. Jour.*, 1911, ii, 593; [illegible] *Jour. Surg.*, 1911, 625; [illegible] *Lancet*, 1911, Aug. 12.

James Sherren.

STOMATITIS (*see also* CANCRUM ORIS *and* SCURVY).—Most of the conditions included under this title are, of course, transient and of no great importance.

Simple Catarrhal Stomatitis, Thrush, the **Aphthous** variety, and the **Chronic** form sometimes met with in adults, very seldom do any harm, and yield in a week or two to treatment, such as removal of the cause and the use of mouth-washes. In weakly infants however, infection with the *Oidium albicans* is sometimes a serious matter, and may turn the scale against the child by leading to semi-starvation and septic absorption. Multiple simple ulcers of the mouth in adults sometimes show a tendency to relapse every spring, and may last for weeks at a time.

Mercurial Stomatitis seldom lasts long, or does any harm, if it is recognized and the drug withdrawn. But if this is long delayed, the patient's mouth may get into a dreadful state, and in rare cases in the past there has been a fatal issue, so that at one time it was a capital offence in France to prescribe mercury as a medicine.

Ulcerative Stomatitis is also a grave disease in weakly children. Usually it yields to treatment with potassium chlorate and other similar remedies, but when the mouth is very foul, with gangrenous areas and white or grey sloughy ulcers, there is considerable danger to life. The writer has seen a case in a boy of twelve, beginning as

an [illegible] condition of the [illegible] and [illegible] [illegible] over the [illegible] borders but [illegible] [illegible] spotting the cheeks. Meningitis and scurvy were excluded, and there had been no previous illness. In spite of cauterization and other energetic treatment the boy got worse, and an attempt was made to burn away the foul areas but he was *in extremis* and died under the anæsthetic.

A. Rentoul Smith.

STRICTURE OF ŒSOPHAGUS. (See Œsophagus, Stricture of.)

STRICTURE OF URETHRA. (See Urethral Stricture.)

STROKES. The term *stroke* or *ictus* is applied to a spontaneous cerebral attack due to some form of vascular disease, whether obstruction or rupture of a cerebral vessel. In some cases, the patient at once becomes comatose and hemiplegic; in other cases, hemiplegia occurs without loss of consciousness.

Prognosis as to Life. The prognosis of recent hemiplegia depends upon the *nature*, *extent* and *situation* of the cerebral lesion.

The Nature of the Lesion. Without regard to this we have to determine whether the case is one of arterial obstruction from embolism or from thrombosis, or one of hæmorrhage from a ruptured vessel. The rapidity of onset of the symptoms is of the most [illegible] importance.

Embolism, as a rule, occurs suddenly, the arterial obstruction being due to a plug of fibrin carried in the blood stream from the left side of the heart, or from the [illegible] wall of an aortic aneurysm. Consciousness may or may not be lost at cerebral onset; in most cases it is lost, and the cases where it is not affected are generally those in which the obstructed artery is a small one, and where the paralysis is of correspondingly less extent.

Cerebral thrombosis from disease of the vessel wall, syphilitic or otherwise, or from morbid coagulability of the blood [illegible], during pregnancy or the puerperium, is usually rapid in onset, though less so than in embolism. In syphilitic cases it is often preceded for days by headache of mental confusion, or there may be pre-hemiplegic convulsions, sometimes unilateral. Unconsciousness deepening into coma may be present as in embolism, if the thrombotic lesion be a large one.

Cerebral hæmorrhage from rupture of a diseased artery or a miliary aneurysm is usually associated with conditions of high blood-pressure, whether from general arteriosclerosis, as in the gouty diathesis or in old age, or from chronic renal disease. In arteriosclerotic cases the actual attack is often precipitated by excitement, emotion, or physical exertion, and a particularly common time of onset is during straining at stool. Other cases occur in morbid blood conditions without vascular disease, as in the bleeding diseases, hæmophilia, purpura, leukæmia, scorbutus, pernicious anæmia; also in certain cases of whooping cough, where the hæmorrhage is usually due to rupture of a cortical vein during a paroxysm of coughing.

Other things being equal—i.e., in lesions of equal size and similar situation—the prognosis as to life is more serious in haemorrhage than in thrombosis, since it is easier to stimulate the circulation in cases of thrombosis than to depress it in cases of haemorrhage. Embolic cases, as a rule, have a good prognosis except when due to ulcerative endocarditis, in which the infective nature of the embolus renders the prospects hopeless.

The Extent and Situation of the Lesion.—The size of the lesion is an important element in prognosis. The larger the area of brain tissue that is destroyed, the graver the prognosis. This statement, however, must be qualified by the further consideration of the situation of the lesion; since it is obvious that a relatively small lesion in the medulla or pons may be rapidly fatal, whereas in the corona radiata it may produce comparatively slight symptoms.

Coma.—The occurrence of coma, and its duration, have an important prognostic value. Coma is one of the signs of increased intracranial pressure, and the larger the haemorrhage, as a rule, the deeper the coma. There is an important exception to this rule in the case of haemorrhages in the region of the medullary vital centres, where a small lesion may prove rapidly fatal.) If the coma be slight in degree, and if it be short in duration, even if deep, we give a favourable prognosis as regards life. Where it is profound and early in onset, very guarded prognosis should be given; and where it persists for over twelve hours without any diminution in intensity, the prospects of survival are small. In cases which are likely to recover, signs of consciousness usually begin to return in two or three hours. Cases which remain deeply comatose for twenty-four hours rarely survive. If a patient with initial hemiplegia and coma returns rapidly to consciousness, and then suddenly relapses into coma, this suggests the presence of a haemorrhage into the ventricles, and the outlook is practically hopeless.

Temperature.—A study of the patient's temperature is also of importance. A normal temperature is a good sign. In cerebral haemorrhage there is often an initial fall, followed by a moderate pyrexia. The more severe the lesion, the more profound are the temperature reactions. In a bad case, the temperature may fall to 96° F. or even 94° F., and the patient may die before the occurrence of any pyrexial reaction; generally the initial fall is followed by a rise. The higher the temperature, the graver the prognosis; and if hyperpyrexia of 105° to 108° F. occurs, the outlook is hopeless.

The Cardio-vascular signs should also be carefully observed. If the pulse becomes abnormally slow or quick, or if its rhythm becomes irregular, the prognosis is unfavourable. A progressive rise of blood-pressure is another unfavourable sign.

Deepening Stertor of breathing, and the occurrence of a *Cheyne-Stokes type of respiration*, are also signs of deepening coma.

Albuminuria or *Glucosuria*, if present, increase the likelihood of a fatal issue, since these conditions indicate the activity of other factors in addition to the mechanical one of the vascular intracranial lesion.

Convulsions, occurring in a comatose and hemiplegic patient, are always of grave import: they indicate cortical irritation, either from a meningeal haemorrhage, or from sudden increase in the intracranial pressure, as when a haemorrhage bursts into the ventricles or into the substance of the pons.

Prognosis as to Recovery. The foregoing signs concern themselves mainly with the immediate prognosis as to life. Should, however, the patient survive the particular attack, the further question arises as to how far his hemiplegic symptoms are likely to clear up. The answer to this question depends upon the size and situation of the lesion. A small lesion which does not interrupt the pyramidal fibres, but merely compresses them, may produce signs and symptoms which ultimately clear up completely. In other cases, where a certain proportion of pyramidal fibres are destroyed, whilst others are merely temporarily compressed, as in a small cortical or subcortical lesion, the original hemiplegia may recede to a monoplegia as the clot shrinks by absorption and the uninvaded fibres recover their function. It is difficult to lay down definite rules for guidance on this point, but it is generally recognized that if any considerable improvement in the hemiplegic symptoms is likely to occur, some signs of return of power will be found within a week or ten days. Improvement, as a rule, begins in the lower limb before the upper. Trousseau stated that when the arm begins to recover before the leg, the ultimate result is less satisfactory: but this dictum is not absolute.

The occurrence of early rigidity of the hemiplegic limbs—i.e., within the first week—is unfavourable as regards recovery of motor power. Rigidity of later onset, with increased deep reflexes, indicates permanent degeneration of the pyramidal fibres.

The appearance of an acute sloughing bedsore on the hemiplegic side, whether over the sacrum, great trochanter, outer malleolus, or heel, in a patient who is being assiduously nursed, and whose skin is being watched and protected (as that of all paralyzed patients should be), is of grave import—the *decubitus anesthesia* of Charcot. Sometimes it occurs within a few days after the onset of paralysis, and is resistant to treatment: it occurs chiefly in cases of profound hemiplegia in which there is a degree of mental obtusion. *Purves Stewart.*

SUBPHRENIC ABSCESS.—Under this heading we include abscesses beneath the diaphragm of varying origin, the majority following perforation of a gastric or duodenal ulcer, or of the vermiform appendix. Tropical abscess of the liver, spinal caries, and a number of other primary causes lead to subphrenic abscess, but much less commonly than those first mentioned. We are greatly indebted to the late Mr. Harold Barnard for his classical study of the subject, based upon the records of 76 cases at the London Hospital.

As a complication of appendicitis this disease is not uncommon, and, unless early recognized and energetically treated, it is almost a death warrant. The usual course of events is that the patient is

operated on about the third or fourth day or later, and a fairly widespread diffused peritonitis is found; the appendix is removed and a drainage tube put in, but the temperature remains high, or falls for a few days and then rises again, and the patient wastes, and may vomit or have rigors. Careful examination may reveal a resistant or tender area in the right upper abdomen, or there may be dullness and absent breath-sounds at the base of the right lung. A skiagram shows very prettily the fixed, high-arched, raised dome of the diaphragm on the affected side.

Having defined what class of cases enters into the argument, we may now inquire into the prognosis.

Barnard reported on 76 cases. Of these:

	12 cases not operated on:	0 lived,	12 died	100 per cent
	64 cases operated on:	40 lived,	24 died	37.5
Barnard's own,	21 cases operated on:	17 lived,	4 died	19

Of the 36 fatal cases, 24 are classed as avoidable, that is, they either passed undiagnosed, or the operation did not secure proper drainage, as for instance when an anterior drain was used in cases demanding a posterior. Posterior drainage is secured by removing part of a lower rib, and traversing the pleural cavity as well as the diaphragm.

In 23 out of 76 cases, the abscess ruptured spontaneously (into bronchus or pleura 9 times, into stomach 8 times).

The operation mortality given by various German authors agrees closely with the figures just quoted.

In estimating the prognosis in any particular instance, it must be borne in mind that when the stomach is the primary locus of the disease the outlook is graver than in appendicitis cases (Sachs). Rigors are an unfavourable sign, 6 out of 10 dying (Barnard) and so is jaundice, because these may indicate portal pylephlebitis. Early operation gives much better results, of course, than late; according to Sachs:

Operation within 3 weeks;	15 per cent died
Operation after 3 weeks;	50 per cent died

Posterior drainage gives better results than anterior, as is shown by Barnard's table:

26 posterior operations;	7 died	27	per cent
43 anterior operations;	17 died	39.5	per cent
4 lateral operations;	3 died	75	per cent

Personally, I have been very satisfied with a postero-lateral drain beneath the diaphragm and lower ribs; this avoids the necessity of having to go through the pleura.

We may conclude, therefore, that in practice about one-third of the cases die, but that careful diagnosis and prompt efficient drainage would probably save four out of five.

REFERENCE.—*Brit. Med. Jour.* 1908, i, 371, 429. *A. Rendle Short.*

SYPHILIS.

1. **Prospect of Immediate Cure in the Primary Stage.**—Excision of the primary chancre was claimed by Auspitz to have cured the disease in [illegible] per cent of 33 cases so treated, but in the experience of other observers [illegible] plan was not attended with success. It is possible that the disease may be considerably modified, and even aborted, by this treatment, if supplemented by injections of salvarsan. The size and situation of the initial lesion seldom admit of this procedure, owing to the mutilation which would be entailed; but there is one class of chancre for which this treatment is appropriate, viz. when the sore is situated at the preputial orifice and can be completely removed by circumcision, the inguinal glands being also excised at the same time.

The earlier the constitutional treatment of syphilis is commenced the better is the ultimate prognosis, and the best test of the efficacy of treatment is the absence of subsequent relapses. The advantage of commencing treatment in the primary stage is well exemplified by statistics on the subject recently brought forward by Colonel Gibbard and Major Harrison (R.A.M.C.), as shown in the following tables.

Table I.

THE ADVANTAGE OF COMMENCING TREATMENT IN THE PRIMARY STAGE: NUMBER OF RELAPSES WHICH OCCURRED WHEN SALVARSAN TREATMENT WAS COMMENCED IN THE PRIMARY AND SECONDARY STAGE RESPECTIVELY.

Six months	Primary	92	5	5·4	6	6·5	11·9
	Secondary	174	7	4	31	17·8	21·8
Twelve months	Primary	70	3	4·2	5	7·1	11·4
	Secondary	130	10	7·6	34	26·1	33·8

From this table it will be seen that the prognosis as regards relapses is far more favourable when treatment is commenced in the primary stage than when it is deferred to the secondary period.

2. **Comparative Value of Salvarsan, Neosalvarsan, Mercury, and the Iodides.**—It is a matter of some difficulty at the present moment to compare the relative merits of salvarsan and neosalvarsan with those of mercury. Ardent advocates of the two former preparations, relying on the Wassermann reaction, claim that by their agency alone syphilis can be cured, and they further claim that mercury by itself has never cured a case of syphilis. The salvarsan treatment has not been in [illegible] for a sufficient period to enable one to assert that any case of syphilis has ever been cured by its agency alone, and further

experience is required before one is justified in stating that salvarsan is capable of preventing the manifestations of tertiary syphilis and of nerve syphilis. Before its advent, innumerable cases of syphilis, treated by mercury alone, were apparently cured: the patients married and produced healthy families, and moreover, their Wassermann reaction, taken since the discovery of that valuable test, has been rendered negative by mercurial treatment alone.

Table II.

COMPARISON OF DIFFERENT METHODS OF USING SALVARSAN. NUMBER OF RELAPSES WHICH OCCURRED IN PREVIOUSLY UNTREATED CASES OF SYPHILIS.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] months	Salvarsan only ..	71	5	7	12	16·9	23·9
	Two salvarsan and four calomel ..	63	2	3·1	10	15·8	18·9
	Two salvarsan and nine mercury ..	132	5	3·7	15	11·3	15·1
[illegible] years	Salvarsan only ..	48	7	14·5	9	18·7	33·3
	Three salvarsan and four calomel ..	52	1	1·9	12	23	25
	Two salvarsan and nine mercury ..	100	5	5	18	18	23

NOTE. From December 12th to April 13th, of 91 cases treated with three weekly injections of 0·6 grm. salvarsan and ten weekly injections of [illegible] have so far relapsed clinically or given a positive Wassermann reaction.

Certainly no case of syphilis has ever been cured by the iodides alone, and they may be regarded as only of value in relieving certain manifestations of the disease, such as ulcers of mucous membranes, and in promoting the absorption of the products of syphilitic inflammation, as in periostitis, etc., but as curative agents they may be disregarded and dismissed from consideration. It is futile to pit two such valuable remedies as salvarsan and mercury one against the other, for there is much to be said for or against either of these two modes of treatment: but it appears now to be generally accepted that the best means of eradicating the disease is by a judicious combination of the methods, and, with a healthy subject thus treated, one may safely give a most hopeful prognosis as regards cure, as regards the impossibility of transmitting disease to the offspring, and as regards immunity from nerve syphilis. In confirmation of this statement, reference may again be made to the valuable statistics recently published by Colonel Gibbard and Major Harrison, in which the relative merits of salvarsan alone

and in combination with calomel cream and mercurial cream are compared. From these figures it will be seen that the percentage of relapses was far less in cases treated by two injections of salvarsan and nine of mercurial cream (Hg, gr. 1) than in those treated by salvarsan alone, or by the combination of salvarsan and calomel cream (Hg_2Cl_2, gr. ¼).

In summarizing the results of their experience, Colonel Gibbard and Major Harrison state that "even if no improvement is made in the method of using salvarsan which has given the best results in our hands, its routine use for the treatment of syphilis in the army is likely to effect an annual saving of 70,000 to 80,000 hospital days, an economy equivalent to the cost of keeping a battalion of infantry in hospital for three months."

The combination of salvarsan and mercury is immeasurably superior to the treatment by mercury alone, as will be seen on reference to the following figures, also supplied by Colonel Gibbard and Major Harrison.

Table III.

COMPARISON BETWEEN SALVARSAN AND EXCLUSIVELY MERCURIAL TREATMENT: TOTAL RELAPSES AND AVERAGE TIME LOST BY EACH SOLDIER IN HOSPITAL, AND ATTENDING AS AN OUT-PATIENT, UNDER TREATMENT WITH MERCURY, AND WITH MERCURY AND SALVARSAN, RESPECTIVELY, DURING THE FIRST YEAR.

Mercury alone	378	42	151	115	49	315	83	66·2	17·6	83·8
Mercury and salvarsan	152	23·2	6	0	0	6	3·9	25·2	15·8	41

The above was written when salvarsan and neosalvarsan were readily procurable in our country; but at the present time the original preparations are no longer at our disposal, and consequently recourse must be made to one of the substitutes. These are galyl, luargol, arsenobenzol and novarsenobenzol (Billon), and kharsivan and neokharsivan (B. W. & Co.). The first-named of these preparations is, in the experience of the writer, far the most satisfactory, since it is not followed by signs of local irritation such as thrombosis in the injected vein, or by signs of arsenical poisoning. The number of injections of galyl necessary for the disappearance of all symptoms of syphilis is far greater than that of salvarsan or neosalvarsan, and

[illegible] a negative blood test can be obtained. [illegible] test, and consequently a favourable [illegible] sufficient course of treatment.

3. **Prognosis as to Infectivity.** The [illegible] of the disease can be abbreviated. The greater the [illegible] both to the patient and to the community. The rapidity of the [illegible] in the early stages of syphilis is remarkable, and both the primary sore and the secondary syphilides will be found to [illegible] a few days, where a similar improvement would [illegible] at after weeks of [illegible] treatment.

4. **Prospects of Appearance of Tertiary Symptoms.** The treatment of syphilis has for its object, not only the relief of the early and contagious symptoms, but the prevention of its progress into the tertiary period, and, if carried out on the principles before indicated, there is a reasonable prospect that the disease will be [illegible] before that stage is arrived at. The best [illegible] is the Wassermann test, and as long as that remains positive, the indication is that treatment should be persisted in. If, after a preparative injection of [illegible] the test remains negative, the inference is that the disease is cured.

But there are certain conditions in which the progress of the disease is not so favourable, and where considerable caution must be exercised before giving a good prognosis. The combination of syphilis with tuberculosis renders the outlook far less hopeful, since the disease is [illegible] to assume a malignant form and one intractable to all measures of treatment. Chronic alcoholism is also a condition in which the disease is less amenable to treatment, and in which obstinate ulcerative lesions, and visceral and arterial degenerations, are liable to supervene. When complicated with malaria, Bright's disease, or diabetes, a very guarded prognosis must be given.

The prospects of the supervention of nerve syphilis depend upon the duration and efficiency of treatment, upon whether the disease is accompanied by any of the complications previously alluded to, and upon the methods and habits of the patient. The man who is leading a strenuous and anxious business life and is overtaxing his mental energies, is certainly more liable to develop symptoms of nerve syphilis than he who is living in the country and enjoying fresh air and exercise, free from all the cares and worries of business.

5. **Inherited Syphilis.**—The number of cases of hereditary syphilis is decreasing, as is also their gravity, an improvement which may be attributed to the more efficient treatment of syphilis in general and to a better recognition of the danger of hereditary transmission. Formerly it was impossible to state with any degree of accuracy if or when a patient was cured of his syphilis, and consequently many persons were permitted to marry prematurely; but at the present time no one who has been infected with syphilis in the past should be advised

to marry, [illegible] In a certain number of cases [illegible] treatment has been carried out for years and yet the blood has never become positive but it does not follow that nothing should be prescribed. It is the opinion of the writer the treatment has been adequate to prevent any possibility of the transmission of the disease, in other words, a continuously positive Wassermann reaction, despite prolonged courses of advanced but safe treatment, is not an indication for marriage or to the prescription of potentially toxic drugs. In the case of a woman contracting the disease despite precautions, it is needless to emphasize treatment to modify the symptoms in the child if not to prevent their appearance. The condition is more favorable if the treatment be administered to the mother and the children treated in small doses supplemented by prolonged treatment, either in the form of injections or tablets. The prognosis in regard to the child improves with each successive pregnancy and considerable hopes may be held out that the mother will eventually be able to produce children free from congenital syphilis. The prognosis in the case of the child the subject of congenital syphilis will depend upon the stage at which the consequences of the disease first manifest themselves, and the later that date the better the prognosis. Mental defect of a degenerative character, interstitial keratitis, etc., are indicated as hereditary syphilis followed by incomplete treatment. *A. Lewis Jones.*

SYPHILIS, CARDIAC.—*(See* CARDIAC SYPHILIS.)

SYPHILITIC JOINTS. There are three varieties of syphilitic joint disease, not infrequently seen:

1. **Acute Syphilitic Epiphysitis,** the so-called syphilitic pseudo-paralysis of infancy. This is merely a severe form of the disease which may be fatal, but if other signs of and very extensive the joints recover, even under inadequate treatment.

2. **Synovitis of Older Children,** the painless dropsies of the knee which occurs in children from six to sixteen, often with interstitial keratitis. It usually clears up completely under treatment in the course of weeks or months, but in one case under my care double effusions and loss had resulted.

3. **Gummatous Arthritis,** the so-called white swelling of joints with tertiary acquired syphilis, usually met with in adults, and most frequently affecting the knee. Unless treatment is very early and thorough, these cases are apt to get a stiff knee, which may also be painful, and in one or two instances which the writer has seen, a limb had to be amputated and if the joint was excised. *L. Rees Short.*

TABES DORSALIS.—The outlook in cases of tabes dorsalis depends, to a large extent, upon the stage at which the disease is first recognized. By the time the patient has become ataxic in his gait, with absent knee jerks and bladder trouble, the disease is already well advanced;

[illegible] in addition, there are trophic changes in the skin, bed sores, [illegible] of other crises, and occasionally the prognosis is not so unmitigated a worse.

It is therefore highly important for the physician to recognize the [illegible] in the early stage, when the patient is still able to walk and stand securely, and when the crises and perhaps the other symptoms consist in paroxysmal lightning pains, especially in the legs; these pains are often mistaken for rheumatism, since they are aggravated by cold or damp weather. On the earliest phenomenon [illegible] becomes transient ocular palsy, with diplopia, squint, or ptosis. It is commonly stated in text-books that the disappearance of tabes in the early stage is established by the combined reaction, loss of reflex [illegible] and loss of knee jerks. But it is generally possible to elicit [illegible] long before the knee jerks are lost. In many cases the knee jerks disappear while the knee joints are still quite good. The diagnostic significance of loss of ankle jerks is [illegible] of the utmost value. Most important of all is the presence of hypermetrosis of the sensory part of the thigh. This is the earliest and most constant physical [illegible] as a general paralysis, and should be looked for in every suspected case. It precedes all the other signs and symptoms.

The course of tabes, as I have [illegible] from several complications, which we shall refer later, is steadily downward. The patient's power of walking grows gradually worse, the ataxia being often apparently exaggerated by the avoidance of his own efforts. Some cases become severely ataxic in the course of a couple of years after the onset of the first symptoms. In others, the disease progresses much more slowly, and the patient may remain in the preataxic stage for many years, complaining only of occasional lightning pains. In others, again, the disease becomes spontaneously arrested at a somewhat later stage, and the patient, already ataxic, gets about for an apparently indefinite time. Some of the symptoms, such as pains, early optical crises, and various visceral crises, may disappear as the disease advances; but once the patient has become ataxic, his uncoordination persists, though it may sometimes be alleviated, e.g., by the use of special courses of exercises.

Tabes does not necessarily shorten life, and it has been truly said of many a tabetic patient outlives his physician. A few cases, however, run an extraordinarily rapid course, and may become bedridden within a couple of years, or even less. Thus, I recall the case of a man who acquired syphilis at the age of twenty-three. His first tabetic symptom was that of transient squint at thirty-one. This cleared up completely in a fortnight. At thirty-three he developed a peculiar sensation in the lower limbs and along the ulnar borders of the upper limbs. A month later, the first signs of ataxia of the legs appeared, and within six weeks he became unable to stand or walk.

The presence or absence of bladder trouble has an important bearing on the prognosis of tabes; and of all the complications, this is one of the commonest, and one which has a truly serious import. Cystitis,

[illegible]

[illegible] referred to [illegible].

[illegible] of vision [illegible] progressive [illegible] of the other [illegible] symptoms. In cases with [illegible] optic atrophy the ataxic symptoms are sometimes arrested for many years, so that the patient, although blind, is able to walk, and to use his upper limbs for fine movements of a delicate sort, such as typewriting, etc.

The various crises (gastric, intestinal, etc.) usually occur comparatively early in the disease. During the course of a crisis, with its urgent pain and intractable vomiting, the patient may become extremely collapsed; but the symptoms often cease suddenly, and recovery then takes place rapidly, usually within a few days.

So-called laryngeal crises are generally of the nature of exacerbations of a chronic bilateral abductor palsy, to which is superadded some slight spasm or hyperæsthesia of the larynx, producing urgent dyspnœa. The prognosis of such attacks is correspondingly grave, and unless promptly relieved by tracheotomy or intubation the attack may actually prove fatal.

Perforating ulcer on the plantar surface of the great or little toe, or on some part of the sole of the foot, is a painless trophic affection which may occur early in the course of the disease. Formerly it was taught that perforating ulcers progress from bad to worse, ultimately producing an abscess or sinus leading into the adjacent joint, or even resulting in gangrene and necessitating amputation. This, however, is not necessarily the case. Rest in bed for a few weeks, and simple

[illegible]

[illegible]

Spontaneous fracture of the bones in tabetic patients chiefly occurs in the long bones, and often in the neighbourhood of a joint which is already the seat of a tabetic arthropathy. These fractures occur spontaneously, i.e., either spontaneously or from trivial causes. They are absolutely painless, and unless the [illegible] render locomotion impossible, the patient may continue to use the broken limb without any consciousness of what has occurred. [illegible] Most [illegible] reunited but with an excessive amount of callus.

Although ataxia is present in a large proportion of cases, it is not necessarily an early symptom; many tabetics suffer from the disease for years without developing it. There seems to be little doubt that [illegible] exertion tends to precipitate its onset. If, therefore, we establish our diagnosis in the preataxic stage of the disease, we may sometimes succeed in retarding or possibly in warding off completely the onset of ataxic symptoms, by impressing on the patient the necessity for abstaining carefully from every form of prolonged muscular exertion. Thus, for example, the amount of walking [illegible] permitted [illegible] should never be enough to induce the slightest fatigue.

Once ataxia has supervened, it may either become slowly and increasingly worse, or it may remain for years practically of the same degree of intensity. Or again in other cases, it may attain to an extreme degree with extraordinary rapidity, within a few weeks, or even days. An acutely advancing ataxia of this sort is aggravated by the very energy with which the patient strives to overcome it. In some cases the ataxia may even improve; and the patient, previously unable to stand or walk, may by practising carefully planned

TALIPES.

Congenital Talipes Equinovarus.

Paralytic Talipes.

TENOSYNOVITIS.—

Simple.—This may be considered under four headings, *serofibrous*, *purulent*, and *adhesive*.

The two former are usually met with in the tendon-sheaths around

[illegible]

Tuberculous. [illegible]

[illegible]

TESTIS, NEW GROWTHS OF. [illegible] Sarcoma was supposed to be [illegible] Nicholson, Morrison Davies, Russell Howard, [illegible] and there are any numerical histories of the testis except the very rare dermoid cysts. The patient from whom Sir James Paget [illegible] typical type specimen of endothelioma was later recorded [illegible] metastases in the heart and lungs.

The modern classification given by Morrison Davies and Nicholson,

Embryoma	Solid Cystic (dermoid)
Carcinoma	Interpaired [illegible] of [illegible]
Sarcoma (round cell)	
Endotheliomata (Rare)	

Authorities differ as to the relative frequency of these forms. Carcinoma and sarcoma are not distinguishable clinically or with the naked eye, and, as far as we know, the prognosis is the same. Some of the embryomata, including the fibrocystic and cartilaginous growths, are much slower and less malignant than the soft vascular tumours.

It should be mentioned that growths of the testis are very frequently confused with haematoceles, and that the patient may give no history of injury in the latter case. This must be borne in mind in giving a prognosis.

The Operation Mortality of treatment by castration is very small except in broken-down individuals. At St. Bartholomew's Hospital, 2 out of 33 died as a result of this operation. From the literature, Kober reports 5 deaths in 106 cases after castration for sarcoma. The more modern procedure of opening up the retroperitoneal tissues about the bifurcation of the aorta and inferior vena cava in order to remove enlarged glands, is no doubt a serious operation, the mortality in 44 cases collected by Hinman being 11 per cent.

The End-results of operation for malignant growths of the testis are very disheartening. The following statistics are available. They are all collections of cases from the literature, not purely hospital records, and are therefore likely to be unduly favourable.

END-RESULTS OF CASES OF NEW GROWTH OF THE TESTIS TREATED BY OPERATION.

Butlin	6 %	53	6		
Kober (sarcoma)		48	[illegible]	6	33
Chevassu		100	19		81
Codman		56	23		33
Hinman		24	3	1	20
" with removal of retroperitoneal glands	11 %	36	9*	11	16
Coley (majority also given toxins)		60	7	5	18

In Kober's statistics (1900), 30 out of 48 followed were known to have recurred, and 3 more died within a year. In Chevassu's series, 81 out of 100 died within a few years. Many observers have been impressed with the great rapidity of recurrence. Within a few months of the castration, there is a huge growth in the retroperitoneal glands. Nearly all the recurrences are in the glands, and take place within A YEAR.

Codman reports a series of 56 cases operated on during forty years at one hospital—the Massachusetts General—most of them verified by the microscope. Of these, 13 were still alive, and 10 died of some

extraneous cause, so that the comparatively large proportion of 41 per cent survived the disease. Perhaps a few of these were not malignant, as the records of some are very old.

Hinman, on the other hand, reporting on a series from Johns Hopkins Hospital, found 20 dead out of 24.

Coley records 60 cases treated for the most part by orchidectomy, followed sooner or later (usually not till recurrence occurred) by his toxins. Of these, 7 were well three years and 5 for a shorter period, and 48 recurred or died. These figures put the treatment to a severe test, as they include many who had already recurred.

Microscopical details as to the cured cases are furnished by Chevassu, Hinman, and Coley, from which it appears that the pure cancers do better than the mixed-celled tumours. Coley's successful cases were nearly all sarcomata, but probably these were specially selected to send to him.

Growths of the undescended testis are likely to be diagnosed late, and do very badly.

We may conclude, therefore, that about a quarter of the patients with a growth of the testis will be saved by castration, that a few of these are of a quiet fibrocystic or cartilaginous type from the first, and that even if recurrence occurs in the sarcoma group, Coley's fluid may pluck a few as brands from the burning.

In children, growths of the testis are ultra-malignant, and cure is practically never obtained. Tumours of the epididymis are very unfavourable. Operation is useless if the retroperitoneal glands can be felt enlarged.

Removal of Retroperitoneal Glands.—Of late years, in view of the very unsuccessful results just quoted, several surgeons have made a practice of removing the retroperitoneal glands around the bifurcation of the inferior vena cava and aorta. A patient was submitted to this operation recently at the Bristol Royal Infirmary (there was a remarkable contrast between the huge incision for the retroperitoneal removal, and the size of the one gland found, which was about as large as a filbert): but within a few months the patient returned with a large inoperable recurrence.

Hinman publishes a study of 44 cases in which this radical operation was carried out. Of these, 11 per cent died of the operation. About half the cases showed malignant involvement of the glands microscopically: as half of these again were inoperable, the operation was only really valuable in 25 per cent of the total number, which compares unfavourably with the high mortality, especially as it is so easy to fail to find every infected gland. Certainly, however, the end-results are promising, though not followed up long enough. The value of the operation is therefore still *sub judice*.

References.—Butlin, *Operative Surgery of Malignant Disease*, 2nd ed.; R. Howard, *Clin. Jour.* 1910, xxxvii, 6; Morrision Davies, *Lancet*, 1912, i, 48; Chevassu, *Rev. de Chir.* 1910, xli, 628; Codman, *Boston Med. and Surg. Jour.* 1914, Feb., 267; Hinman, *Jour. Amer. Med. Assoc.* 1914, Dec. 5; Coley, *Ann. Surg.* 1915, lxii, 90.

A. Rendle Short.

TESTIS, TUBERCULOUS.—(*See* EPIDIDYMITIS, TUBERCULOUS.)

TETANUS.—Considerable progress in our knowledge of this disease has been made by the experiences of the Great War.

Prospect of Acquiring Tetanus after a Wound.—It has long been recognized that clean wounds are seldom followed by tetanus, but that when the injury is earth-infected (particularly if the earth has been contaminated by animal fæces), is deep, suppurating, and contains dead tissue, there is a real risk that this terrible disease will supervene. In America, burns contracted in streets or gardens from fireworks on Independence Day have been a potent source of infection. The heavily manured soil of Flanders gave rise to a serious outbreak amongst the wounded in the early stages of the Great War. About 15 per cent of the wounds contained the bacilli. Some German and French figures, quoted by McConkey, go to show that of 83,000 wounded, before antitetanic serum came into routine use, 0·65 per cent developed tetanus. In the Franco-German war of 1870 the German figure is given as 0·36 per cent; in the Crimean war, amongst 12,000 English wounded, 0·15 per cent.

Both in animals and in man (Semple), intramuscular injections of quinine appear to have the property of lighting up the activity of tetanus germs buried in some old healed wound.

Wounds of the leg appear to be more likely to lead to the disease than those of other parts.

Wounds that are already granulating are not easily infected.

The commonest day to show symptoms is the tenth; after the third week the risk is very small, but a case has been recorded as late as 365 days after receipt of the wound (Bruce).

Prevention of Tetanus. Tetanus may be prevented to a considerable extent by early and efficient treatment of the wound, and by giving a prophylactic dose or doses of antitetanic serum.

The most important factor in the treatment of the wound is the excision of damaged tissues, removal of foreign bodies, and provision of good drainage. By this means suppuration is controlled, and the nidus of the tetanus germ in dead muscle or clot removed. Antiseptics are of much less value. Carbolic acid (1/20) takes fifteen hours to kill tetanus spores; pure phenol is no better (Embleton). Eusol is said to kill in a few minutes. Hydrogen peroxide appears to be of some value.

There is clear evidence of the value of prophylactic injections of 500 units (U.S.A.) of antitetanic serum. Deaths from Independence Day tetanus rose to 417 in 1903. A campaign in favour of the use of serum injections for the burns was inaugurated by the American Medical Association, and the figure fell to 6 deaths in 1912 and 3 in 1914.

During the present war the incidence of tetanus has undoubtedly become much less since serum has been used as a routine prophylactic, but reliable statistics bearing directly on this point do not appear to

be available. Wolf describes what he has seen in a stationary German field hospital on the Western front: before December, 1914, without antitoxin, 1·4 per cent of wounded developed tetanus; in the seven months following, all grenade and shrapnel wounds getting antitoxin, the incidence fell to 0·16 per cent. Far more cases of the disease were seen in England during September and October, 1914, than in the following months; but this may be partly due to differences in evacuation.

The immunity has been shown experimentally to last only about a week. It is therefore probable that much better results will be obtained when antitoxin is repeated weekly so long as a dirty deep wound is present.

The serum treatment has certain drawbacks, especially when given by the intraspinal or intravenous routes. An urticarial rash several days later is common. If the serum is infected, suppuration may follow. If the patient has had horse serum—whether with an antitoxin or otherwise—more than ten days previously, anaphylactic symptoms may follow, and two or three deaths are on record: this may be avoided by giving fractional doses.

There are cases recorded by Simon and others, of which the writer has seen one, in which within twenty-four hours the serum causes trismus, which looks very alarming. They recover in a day or two.

The Prognosis in Declared Tetanus.—The pre-war mortality of tetanus was about 83 per cent of acute, and 44 per cent of chronic cases. In Italy, judging by published statistics, it appears to be a good deal less. In Denmark, the figure is given as 79 per cent (Permin, 199 hospital cases).

In individual cases, several factors have to be considered.

Age and *sex* are not important.

The incubation period is significant. Permin quotes:

Incubation period of 10 days or less,	94 cases,	94·7 per cent died		
" " over 10 days,	57	"	70·2	"
" " unknown,	48	"	58·3	" "

In Sir David Bruce's first series (231 cases):

Incubation period of 10 days or less,	66·6 per cent died	
" " 11th to 25th day	39	

When there is no history of a wound, or a very remote one, the majority get well.

Survival Period.—Hippocrates pointed out, and my experience in a series of 28 cases at the Bristol Royal Infirmary confirms his statement, that if the patient survives the fifth day the chances are slightly in favour of recovery. After ten days the probabilities are great.

Second Attacks.—French authorities quote four or five instances of this. Some die; some recover.

Severity of the Symptoms.—It is most difficult to judge of the prognosis from these, unless the case is abnormally slight or abnormally

severe. Frequent or powerful spasms, indicating involvement of the cerebrum, as well as the spinal cord and mid-brain (which are responsible for the tonic condition), are almost a death warrant. High fever is a bad sign. There is sometimes a delusive temporary improvement on the third day, followed by death.

In the cases that will recover, there are usually few and slight spasms, or none at all.

Recovery is slow; the patient may be stiff for a month or more, the masseters relaxing last.

There is a type of *local tetanus*, lately recognized, especially by French writers (Courtellemont, Montais, and Broca), Napier Burnett and Tulloch, and Ritson, in which, after a wound of a limb, there is persistent spasm and rigidity, with exaggerated reflexes, even under an anæsthetic. This may last many months, but is not usually fatal. A similar condition is met with after injecting tetanus toxin in small animals.

According to French war experience, the Rose cephalic type, associated with facial palsy, is rather favourable.

Prognosis as Influenced by Treatment.—Patients who have had antitetanic serum as a preventive do better than those who have not. In Sir David Bruce's first series of 231 cases in English base hospitals, August, 1914, to August, 1915, 57·7 per cent died. Only 37 had had antitoxin, and only 8 on the day of the wound: of these 37, 51·3 per cent died. In his third series, August to October, 1916, 200 cases, the results are better:

1st series:	231 cases,	57·7 per cent died;	37 had had serum,	51·3 per cent died		
3rd series:	200 ,,	36·5 ,,	,, : 102 ,,	,, ,,	27·3	,, ,,
			87 perhaps ,,	,, ,,	44·8	,, ,,
			11 had not had serum,		54·5	,, ,,

It must be remembered, however, that these figures might be vitiated by the time factor. If cases are kept longer in France now, as is very possible, the later series would represent patients with a longer incubation period, and therefore a milder type. This would not explain the difference in mortality between the inoculated and non-inoculated. A recent series of 160 cases from base hospitals in France shows a mortality of 72·7 per cent (Leishman and Smallman). It is not very conclusively proved, therefore, that prophylactic antitoxin makes for a milder attack, although this is probable.

Curative Value of the Antitoxin after the Symptoms have Appeared.—This is still in some doubt. Many observations have been made to find the best method of administration. Both in experimental animals and in man the value of the serum is much less after the onset of symptoms than as a prophylactic, because the tetanus toxin is already bound to the nerve-cells.

A table of reliable statistics collected by Permin from the records of Danish hospitals shows:

Treated without antitoxin,	199 cases;	79 per cent died	
,, with ,,	189 ,, :	58 ,,	,,

Route of Injection.—Park and Nicoll injected twice the fatal dose of tetanus toxin into guinea-pigs, and seventeen to twenty-four hours later gave an antitoxin by various routes, with the following results:

6	guinea-pigs were treated subcutaneously,	6	died
15	" " " intracardially,	13	"
16	" " " intraspinally	3	"

There is some human evidence that the intraspinal route is the best, as shown in the accompanying table. Sir David Bruce's careful statistics are specially trustworthy. The usual dose is 3000 units, and it may well be repeated, under an anæsthetic, supplemented by injections of serum subcutaneously.

TREATMENT OF TETANUS WITH ANTITOXIN.

Bruce:								
1st series	116	60·3	24	75	215*	45·2		
Von Graff	—	—	—	—		—	88	80
Hofmann	13	54	—	—	16	12		
Rogers	—	—	7	43				
Ashhurst	—	—	23	56				

Sir David Bruce's third series, however, does not show any advantage for the intraspinal over the other routes, so the point cannot be regarded as settled.

Intracerebral injection is dangerous, and has led to abscess of the brain. Neither it nor the intravenous route presents any advantage. Sir David Bruce cannot find any evidence from his statistics that colossal doses give any better results, but before the war Jacobsen and Pease cured 15 cases out of 20 by this means. Their patients, however, seem to have suffered from a mild type of the disease.

The Carbolic-acid Method has been severely hit by war experience. Baccelli, its author, quoted 92 out of 94 'severe' cases recovering, and 16 out of 38 'very severe.' Apparently no mild cases were treated! The figures were obtained by a most misleading method—picking out from the literature isolated reportings of one or two cases treated by a host of Italian doctors. Tetanus also seems to be comparatively mild in Italy. Sir David Bruce quotes 33 war cases; 63·6 per cent died.

Magnesium Sulphate Injections into the Spinal Theca are also falling into disrepute, because several cases of fatal respiratory failure have occurred. Sir David Bruce reports 9 cases, with 7 deaths. Phillips had 7 cases, with 3 deaths.

Rest, quiet, and sedatives, especially chloretone, appear to make the patient more comfortable, and probably improve the prognosis. It would seem to be dangerous to attack the wound during the presence of symptoms: theoretically, this might cause more toxin to be absorbed.

References. McConkey, *Brit. Med. Jour.* 1914, ii, 609; McConkey, *Ibid.* 1915, ii, 849; Bruce, *Ibid.* 593; Bruce, *Ibid.* 1917, i, 888; Wolf, *Münch. med. Woch.* 1915, No. 39; Browning, *Brit. Jour. Surg.* 1916, July, 14; Permin, *Mitteil. a. d. Grenzgeb. d. Med. u. Chir.* 1914, xxvii, 1; *La Pratique de la Chirurgie de Guerre*, 1916, p. 51; Burnett and Tulloch, *Brit. Jour. Surg.* 1916, July, 43; Ritson, *Ibid.* 49; Park and Nicoll, *Jour. Amer. Med. Assoc.* 1914, July 18; Hofmann, *Beit. z. klin. Chir.* 1907, lv, 697; Ashhurst, *Amer. Jour. Med. Sci.* 1913, cxlvi, 77; Baccelli, *Berl. klin. Woch.* 1914, xlviii, 1021; Phillips, *Proc. Roy. Soc. Med. (Med. Sect.)* 1910, ii, 39.

A. Rendle Short.

THORACIC DUCT, WOUNDS OF.—Very alarmist reports have been given in the past as to the probable fatal consequences of this accident. In actual practice, however, it is certain that no serious harm need be anticipated. Apparently the chyle finds its way into the veins by some alternative channel. Zesas has collected the records of 49 cases from the literature, of which 5 died; but only in one of these, and that doubtfully, had the accident anything to do with the fatal issue. Gauze plugging sufficed to cure most; some required ligature.

In a case recently reported by Mr. Harrison, of Hull, the duct was implanted in the external jugular vein with success. He gives some account of the literature.

References. Zesas, *Deut. Zeits. f. Chir.* 1912, 197; Harrison, *Brit. Jour. Surg.* 1916, iv, 394.

A. Rendle Short.

TIC DOULOUREUX.—(*See* Neuralgia.)

TONGUE, CANCER OF.—Cancer of the tongue and floor of the mouth is one of the most malignant forms of epithelioma, and although there has been a considerable improvement of late in the results of treatment, the outlook is much graver than in cases of cancer of the lip or breast. The prognosis may be considered under the following headings:

1. **Prognosis Apart from Operation.**—It is doubtful if any authentic cases have ever recovered, and it is very unusual for the patient to live more than two years. Not uncommonly the period may be as short as time as six months. Patients are sometimes extraordinarily unobservant, and may appear to notice nothing wrong until within a few months of the end. The average duration of life, in cases not operated on, may be taken as about fourteen months from the first onset of symptoms (Rowntree, average of 90 cases). In 37 cases operated on, but recurring, the duration of life was seventeen months; but possibly these were rather slower growths from the outset.

The cause of death is nearly always from lung troubles such as septic pneumonia or abscess (114 cases out of 146 autopsies—Rowntree). A few (9 out of 146) die from hæmorrhage. Secondary growths in the

neck are almost constant; in the viscera they are rare. In 147 autopsies Rowntree reports the following metastases: liver in 8 cases; lungs in 7; pleura, kidney, and larynx, 4 each; suprarenal, 3.

The patient's last few months of life are generally very miserable. The foul, ulcerous mass in the mouth, profuse salivation, pain in the tongue and ear, and inability to talk constitute the principal part of his sufferings. The glands of the neck form a huge adherent mass which occasionally suppurates and fungates, or may press on the air passages; but it is well known that death from glandular involvement is far less terrible than that from the growth in the tongue. Palliative methods of treatment, such as cutting the lingual nerve, give only a brief and partial respite. Radium is less effectual for cancer in this than in other situations, and seldom delays the growth much.

2. **The Mortality of Operation**.—It will be obvious that this will vary much according to the type of operation performed, the state of the mouth as regards sepsis, and the stage which the growth has reached.

A considerable body of reliable statistics is now available, from which we may judge of the mortality with accuracy. Some of them are hospital figures, probably the best information obtainable. Others are the results of individual operators, which do not appear to be fabricated in any way, and a few are collected from the literature, which is always unreliable as an indication of mortality, because successes are reported while failures are not.

Table I.—Mortality of Operations for Cancer of Tongue.

Rowntree, Middlesex (glands *usually* left)	109	10·9	—	—	32	28·1		
Whitehead (tongue only)	116	2·6						
Do. (all operations)	139	14·3						
Massachusetts	20	5	—	—	29	10·3	9	33
Boyd and Unwin	—	—	33	24·2				
Ehrlich, Vienna	—	—	49	25				
Ehrlich, German and Swiss literature	—	—	306	16				
Caird (all operations)	—	—	47	14·8				
Berlin	—	—	197	10				
Do. from literature, 1887	—	—	—	—	—	—	47	27
Bristol Royal Infirmary	12	8·3	17	5·8	—			
Probable average	—	5	—	15	—	18	—	30

Simple removal of the tongue, or rather of half the tongue in the great majority of cases, without touching the glands of the neck, appears to have a mortality of about 5 per cent, though Whitehead reports a long

series in which he only lost 2·6 per cent. He also gives figures inclusive of all his operations (Syme's method, etc.), with a mortality of 14·3 per cent. Rowntree's figures for the Middlesex Hospital do not distinguish between the many in which the neck was untouched and the few in which all the glands were cleared. His statistics relate in part to the surgery of many years ago, and for these two reasons the figure 10·9 per cent. is too high. The Bristol and Massachusetts Hospital patients are but few.

In the cases included in this table, laryngotomy and tracheotomy were not performed.

Removal of Half the Tongue followed by Clearing the Glands of the Neck.—This, which is now regarded as the best formal treatment in ordinary cases, has a mortality probably of about 15 per cent. in cases where the two operations are performed at the same time; when they are separated by an interval, it is perhaps no more than 5 or 10 per cent., as in Butlin's and the Bristol figures. Some of the deaths in Caird's cases appear to refer to Syme's operation. The German and Swiss figures lack details of method, and in the Vienna statistics given by Ehrlich, the neck and tongue were usually cleared at the same time. Butlin records 22 cases with 4 deaths when both were dealt with at once, and 48 cases with only 2 deaths when there was an interval of a few weeks.

Kocher's Operation.—Few modern statistics of this method, in which the tongue is removed by the submaxillary route, appear to be available. The Middlesex Hospital figures, in which the operation was reserved for bad cases, show a mortality of 28·1 per cent. At the Massachusetts Hospital, where it was resorted to much more freely in comparison with other methods, only 10 per cent. died.

Syme's Operation.—When the jaw has to be divided to remove the cancer, the outlook is necessarily grave. The few available figures suggest a death-rate of 1 in 3 or 1 in 4.

The Prospects of Cure.—We are now in possession of sufficient evidence, from a variety of sources, to be able to judge of the prospect of a lasting cure, and as we have hospital figures as well as those of individual surgeons, we may accept them with some confidence. If recurrence is going to take place in this particular form of cancer, it almost always does so in less than three years.

Taking all cases and all operations together, it will be seen that the percentage of patients cured is probably from 15 to 20. Butlin's extensive figures give a much better result than this, but hospital statistics are less favourable than his.

It makes a great difference to the prognosis whether or no the neck is cleared of glands as a routine, even when no enlarged glands can be felt. Thus Butlin reports: glands left, 29 per cent. cured; glands removed, 42 per cent. cured. In our Bristol figures, the writer treats glands left, 8 per cent. cured; glands removed, 11 per cent. cured. Several operators fail to get such good success in spite of clearance of the neck. The Vienna figures are very poor (13 per cent. cured).

Ehrlich's report of German and Swiss literature shows that of 306 cases, 19 per cent were well three years, and a further 11 per cent still free from recurrence for a shorter period.

Table II.—Prospect of Cure after Operation for Cancer of the Tongue.

Butlin	All operations	175	31	3
Do.	Tongue only removed	41	29	3
Do.	Tongue & glands removed	57	12	3
Massachusetts Hospital	Tongue removed, glands usually left	58	17.2	3
Bland and Unwin	Tongue & glands removed	31	19.3	1
Gerlich	Tongue & glands removed	25	16	3
Gerlich, Vienna cases	Tongue & glands removed	49	13	3
Gerlich, from German and Swiss literature	Sometimes glands also removed	306	19	3
Bristol Royal Infirm.	All cases	29	14	3
Do.	Glands left	12	27.5	2
Do.	Glands & tongue removed	17	8	2
			41	2

We may conclude that about a third of cases operated on by removal both of tongue and neck glands will be cured. This is a much better result than was obtained years ago.

Information as to the prospect of cure in special circumstances is not so complete. When it is necessary to split the jaw (Syme's operation), recurrence is very probable. Of 5 Bristol cases and 9 Massachusetts Hospital (14 in all) not one was cured. Statistics of Kocher's operation do not appear to be available.

In almost all the patients mentioned in the table, only half the tongue was removed. Probably slightly better results could be got, at the cost of severe crippling, by a total removal. As Lenthal Cheatle has pointed out, surgeons have not been in the habit of removing the half-tongue deeply enough. The geniohyoglossus should be taken.

When glands are palpable in the neck, the outlook is very grave, but not hopeless; the Massachusetts records show six cured in spite of this sign. In one of our Bristol cases the glands proved to be tuberculous. Operation for recurrence occasionally gives a cure. Butlin records two living respectively 8 and 13 years, out of eight operations for recurrence in the neck glands.

The Time and Situation of Recurrence.—In modern practice, recurrence in the neck and in the mouth occurs with equal frequency. In older days, such as is represented by the Middlesex Hospital cases, which go back for many years, a more restricted removal was attempted and local recurrence was commoner.

Rowntree found that glandular recurrence averaged seven months

after operation and local recurrence six months. In two of our Bristol cases there was freedom from symptoms for nearly three years, one recurring in the tongue and the other in the neck.

Table III.—SITE OF RECURRENCE.

Rewtree, Mitchiner, Hewetson	90	33	57
Butlin	90	45	45
Bristol Royal Infirmary	14*	7	6

The Condition after Operation. Removal of half the tongue usually makes but little difference, eventually, to the speech. One of our Bristol cases a schoolmaster could talk perfectly. Swallowing is also unaffected. It must be admitted that if the genioglossus is removed, speech is more seriously affected. Even after bilateral removal the patient may be quite intelligible, but there is of course marked speech defect in these cases. One can almost always promise that the speech will be interfered with much less by the operation than by the progress of the growth.

If there is no local recurrence, the patient's condition is undoubtedly far less miserable than it would have been apart from the operation, because the glands of the neck do not give rise to the same pain and horrible fetid mouth condition. Even if the cancer returns in the mouth, there is often six months or more of comfort first.

REFERENCES.—Rewtree, *Lond. Hospital*, 1916, xvii, 134. Whitehead, *Practitioner*, 1903, lxx, 580. Greenough and others (Massachusetts Hospital Reports), *Boston Med. and Surg. Jour.*, 1909, clx, 508. Bond and Swan, *Practitioner*, 1903, lxx, 626. Frankel, *Lond. Lancet*, 1909, Bd. 88, i, 427. Grant, *Lond. Med. Jour.*, N.S., vi, 1911, 5. Butlin, *The Operative Surgery of Malignant Disease*, London, 1900, 2nd ed., 150. Butlin, *Brit. Med. Jour.*, 1909, i, 1. A. Rendle Short, *Brit. Med. Jour.*, 1912, i, 877 (an amplified account is here made use of).

A. Rendle Short.

TONGUE, PAPILLOMA OF. This condition very seldom gets well apart from treatment, but an early free removal usually leads to cure. It must be borne in mind, however, that in persons over forty the majority of these cases undergo malignant changes, and what appears to be a simple tumour often returns in a few months or years.

A. Rendle Short.

TONGUE, SARCOMA OF. There are about fifty cases of this rare disease in the literature, but probably only about thirty are worthy of acceptance. The outlook is not so grave as in sarcoma generally and is better than that of cancer of the tongue. Of 26 cases followed after removal, 11 were cured (17 over three years and 12 recurred).

REFERENCE.—Fripp and Jocelyn Swan, *Practitioner*, 1907, lxx, 673.

A. Rendle Short.

TRIGEMINAL NEURALGIA.—(*See* NEURALGIA, TRIGEMINAL.)

TROPICAL FEVERS.—The more important fevers of the tropics are dealt with under their respective names. Those with little or no mortality are the following.

Three-day or **Pappataci Fever** is of common occurrence in North-West India and around the Mediterranean Sea, but is unattended with mortality unless it happens to complicate some more serious disease.

Dengue Fever (with which may be included the seven-day fever described by Rogers, which many authorities consider to be sporadic dengue) also has no mortality except rarely in old or feeble subjects, but may leave much debility.

Malta or **Undulant Fever** is a more serious affection, on account of its long duration and occasional severity. Hughes found its mortality in military hospitals in Malta to be but 2 per cent, although it has been stated to be as high as 9 per cent among the civil population of the island, who are less favourably placed regarding treatment. A malignant type of the disease, with a typhoid-like temperature, dry tongue, and tendency to hyperpyrexia, caused over three-fourths of the mortality within a month or two of the onset, while the remainder occurred in relapses with debility and anæmia.

A general decline of the temperature to subnormal, with a clean tongue, usually indicates the termination of the disease. The discovery that the infection is carried by goat's milk has led to the disease being practically eradicated from the military forces at Malta. Serum treatment has not been successful, but recently sensitized vaccines have been reported on favourably. *Leonard Rogers.*

TRYPANOSOMIASIS AND SLEEPING SICKNESS.—This is one of the most deadly diseases known, although apparent recoveries have been recorded in patients treated in the early stages; but when the organisms reach the cerebrospinal membranes in the later stage of sleeping sickness the disease is always fatal within a few months. In the earlier stages the prognosis varies in the two types of the disease, that due to *T. gambiense*, occurring in the more northern parts of Africa, being less virulent than the type caused by *T. rhodesiense* of more southern Central Africa, which is almost invariably fatal within a few months, while no recovery has yet been reported. The first type, however, often lasts for several years, and a few cases have been recorded in which, under prolonged treatment with arsenical and antimony preparations, the parasite and fever have remained absent and good health been maintained for a number of years with a fair prospect of the recovery being permanent. *Leonard Rogers.*

TUBAL DISEASE.—(*See* SALPINGITIS.)

TUBAL PREGNANCY.—(*See* ECTOPIC PREGNANCY.)

TUBERCULOSIS. (*See* ARTHRITIS, CÆCUM, ENTERITIS, ENTEROLYMPHITIS, LYMPHADENITIS, AND PERITONITIS, TUBERCULOUS; LARYNX, TUBERCULOSIS OF; PULMONARY [illegible])

TYPHOID FEVER. — There are several factors which influence the prognosis in this disease, and the most important of them are: (1) *The age of the patient*; (2) *The sex*; (3) *The character of the attack*; (4) *The presence of certain symptoms*; (5) *The occurrence of certain complications*; and (6) *The treatment*.

1. **Age.**—The following figures derived from the records of 21,571 patients admitted into the hospitals of the Metropolitan Asylums Board during the years 1871 to 1907, indicate to what extent age is of importance in prognosis in respect of recovery:

FATALITY ACCORDING TO AGE.

Under 5	9·6	30 to 34	24·3
5 to 9	7·6	35 to 39	25·5
10 to 14	10·4	40 to 44	27·1
15 to 19	15·7	45 to 49	28·0
20 to 24	18·8	50 to 60 and upwards	32·4
25 to 29	22·5		

From this table it will be seen that the most favourable ages are those between five and ten years, and those under five the next most favourable. Over ten years, the fatality steadily increases from 10·4 to 32·4 per cent as the age rises. One of the reasons for the lower fatality under ten is the infrequency of the serious complications of haemorrhage and perforation at those ages; from which fact it may be inferred that deep and extensive ulceration of the bowel is not so common in children as in adults.

2. **Sex.**—The prognosis is, on the whole, slightly more unfavourable in the male than in the female sex. The total fatality of the 2,[illegible]1 cases quoted above was 16·3 per cent; amongst these, the fatality for males was 16·8 per cent and for females 15·9 per cent.

3. **Character of the Attack.**—All who have had a wide experience of typhoid fever recognize that the clinical characters of the cases which come under their observation vary considerably from time to time. In some years the disease is more fatal than in others. Thus at the Eastern Hospital, Homerton, the annual fatality has varied during the course of twenty-one years from 6 to 28 per cent. The variation has been quite irregular. The incidence of complications also varies in much the same way. Doubtless there are several factors which have an influence on the character of the attack. Age has already been mentioned. Besides this, there are the factors of the

virulence of the particular typhoid bacilli concerned, and the resisting power of the patients. Possibly too, the dosage (i.e. the number of the bacilli with which the patient has been infected) is of importance. There are reasons for believing that the larger the dose is, the shorter is the incubation period and the more severe the attack.

4. **The Presence of Special Symptoms.** The following symptoms must always be regarded with apprehension: A continuously frequent pulse, 130 to 140 or over, more especially if it is at the same time dicrotic (a dicrotic pulse, provided that the pulse rate is not too frequent, is not necessarily a bad sign); cutaneous hæmorrhages (petechiæ, which may be due either to a failing heart or to hypostatic congestion); coma or semi-coma, with muttering delirium and subsultus tendinum; frequent action of the bowels, with loose and offensive stools; tympanites; a dry fissured tongue; involuntary passage of the urine and fæces; a strong presentiment of death.

A continuously high temperature (103° to 104°) is not of necessity unfavourable, unless accompanied by some of the symptoms just mentioned. But if the temperature shows no signs of falling after four weeks of illness, the outlook becomes less bright. A rigor, though an alarming symptom, is, on the whole, not an unfavourable one, unless it is accompanied by symptoms indicative of perforation, of which it may be one of the signs. Rigors occur under a great variety of conditions in typhoid fever. Often they are entirely inexplicable. A rigor during convalescence may be the herald of a relapse.

It has been shown by Harold Scott that the prognosis is aided by a careful study of the serum (Widal) reactions. It is well known that the property of agglutinating the specific bacilli is not usually present, at any rate in any marked degree, during the first few days of the illness. According to Scott, in a case of average severity the reaction is usually quite distinct by the seventh day of the fever. If it occurs as early as the third or fourth day, the case is most likely to run a mild course. On the other hand, if the appearance of the reaction is delayed to beyond the end of the first week, the case is likely to be very severe. In some of the most serious cases the reaction continues to be negative for some three or four weeks after the beginning of the illness.

5. **Complications.** The occurrence of almost any complication affects the prognosis unfavourably, even though it may be to a slight degree only, because it prolongs the course of the illness and keeps up the risk of additional complications. But some are much more grave than others. The two worst are perforation and hæmorrhage.

Perforation is by far the most serious complication of typhoid fever, and accounts for a fourth to a third of the total number of fatal cases. It occurred in 3·41 per cent of 8997 cases which were under treatment in the hospitals of the Metropolitan Asylums Board during the ten years 1900 to 1909; but the incidence varied in different years from 2·7 to 5·4 per cent. Unless remedied by operation, perforation is

nearly always fatal, for not more than 1 per cent of the cases recover. Usually, death from peritonitis results in three to four days from the perforation, but occasionally the fatal event is due to collapse, and may occur within a few hours or even minutes. Further consideration of this complication will be given later when the treatment is being discussed.

Occasionally one is able to diagnose *peritonitis* without being certain that it is due to perforation. But the former is as grave a complication as the latter, because it is nearly always due to it, though the symptoms may not be clear.

The symptoms of perforation are: sudden, and often (but by no means always) severe, pain in the abdomen, especially in the right iliac region; pain on palpation of the abdomen; alteration in the condition of the abdomen, usually in the direction of some distention; rigidity of the abdominal wall, especially on the right side; thoracic respiration; an increase in the pulse-rate; a sudden rise or fall of temperature; occasionally vomiting and a rigor; collapse.

Hæmorrhage from the bowel is, next to perforation, the most serious complication. It is considerably more frequent than the graver event, and was observed in 9 per cent of the cases referred to above. In these statistics, only those cases of hæmorrhage are included which were sufficiently severe to call for treatment. Both hæmorrhage and perforation are met with in the most serious cases of typhoid fever; and neither of them can occur except when the bowel has been deeply ulcerated. Hæmorrhage is seldom fatal of itself at any rate immediately; but a repeated loss of moderate amounts of blood weakens the patient, and so conduces to and hastens a fatal termination. As bleeding in any considerable amount cannot take place unless the bowel is deeply ulcerated, it is not surprising to find that perforation is preceded by hæmorrhage in not a few cases: I have seen it in about one-fifth of the cases of perforation at the Eastern Hospital. Profuse arterial is more serious than profuse venous hæmorrhage. Occasionally hæmorrhage is concealed, that is to say, the blood does not pass per anum. In that case it may be diagnosed by the occurrence of pallor, restlessness, a frequent, feeble pulse, collapse, and sighing respiration. The combination of these symptoms is most serious.

None of the remaining complications of typhoid fever, whether serious or not, are at all frequent: they do not exceed 3 per cent. The most grave are *lobar pneumonia*, *meningitis*, and *nephritis*. These are dangerous to life. *Ulceration of the larynx* is usually met with in severe cases only. If the patient recovers, permanent stenosis of the larynx may remain. *Hæmorrhagic typhoid fever*, in which cutaneous and subcutaneous hæmorrhages and bleeding from various mucous membranes occur, is almost invariably fatal.

A *relapse* is to be expected in about 10 per cent of the cases. Usually it begins within three weeks of the final cessation of the fever. In a few cases, however, I have known a relapse to occur after a longer

interval, even six weeks. It is impossible to prognosticate the occurrence of a relapse with any degree of certainty; but J. D. Rolleston states that the diazo-reaction reappears at its commencement, and that the disappearance of the abdominal reflex is also a warning. This reflex vanishes during the acute stage of most cases of typhoid fever, but reappears when the temperature has become normal. The fatality of relapses is about half that of primary attacks; and they are less likely than the latter to be accompanied by complications.

There are a few complications which are prone to show themselves more often during convalescence than during the febrile stage of the disease. Of these the most common are *venous thrombosis* and *acute periostitis and necrosis*. They occurred respectively in 2·3 and 1·2 per cent of the cases referred to. The former may follow an acute phlebitis, which may arise in almost any vein, but is met with most often in one of the veins of the leg. But most frequently thrombosis is due to a combination of a sluggish circulation and an altered condition of the blood. The veins most frequently affected are those of the left thigh and leg, which become swollen. It is usually months, and it may be years, before the limb regains its normal state. Sometimes the œdema is permanent. In this complication there is always some risk of the detachment of a fragment of clot, and therefore of pulmonary embolism or cardiac thrombosis; but fortunately these results are rare.

Acute periostitis, which may result in necrosis of the underlying bone, may arise at any time after the acute stage of typhoid fever. Usually it comes on within the first few weeks, but it has been known to show itself years after an attack. Sometimes a definite sequestrum forms; in others, the necrosed bone crumbles, and these cases are prone to become tedious and to resist treatment. The bones most frequently affected are some of the long bones, especially of the leg; but almost any bone in the body may be the seat of the inflammation. Rarely are the bones forming a joint involved, but when they are, the joint may be permanently damaged.

In '*typhoid spine*' there is a periostitis of the vertebræ. This complication is rare. It has been met with in the male more frequently than in the female sex. The course of the disease is prolonged, extending to several months or a year; recovery is usually complete.

In a few cases an attack of typhoid fever is followed by, or it would be more correct to say becomes merged in, one of *acute dementia* (mania or melancholia). As a rule this condition is connected with a very severe attack of the fever, but I have known it follow quite a slight attack. The prognosis is, on the whole, favourable, and the patient recovers in about a year's time.

Influence of Pregnancy.—I have had under my care 38 women who have been attacked by typhoid fever during pregnancy. Of these, 8 died, a fatality of 21 per cent, about the average rate amongst women of the child-bearing ages. Miscarriages or premature confinements took place in 27 instances; all the fatal cases occurred amongst

these 27. If a pregnant woman is attacked by typhoid fever before the child is viable, miscarriage is very likely to occur; in fact it did occur in 25 of 30 such cases. If she is attacked after the child is viable, there is a better chance of her going to full term; though even then the child may be weak and frail. Some of the women left the hospital undelivered. Supposing that each of them was subsequently confined of a healthy child, then, of 38 pregnancies, 8 ended favourably both to mother and infant. But certainly in 28 of the 38 cases the child was either born dead, or died within a few hours of birth. The prognosis, therefore, in the case of the child is bad.

6. **Treatment.** Of few, if any, of the acute infectious diseases of this country has more been written concerning treatment than has been written of typhoid fever. Baths (cold and warm), intestinal antiseptics, liberal feeding, semi-starvation, copious water-drinking, serum and vaccines, have all had, and still have, enthusiastic supporters, each of whom proclaims that his is the best treatment, and indeed the only one worthy of consideration. But unless the observer has at his disposal a very large number of cases, extending over a considerable series of years, the conclusions he draws from them are likely to be highly erroneous, on account of the natural variation in the severity of the disease from one year to another.

The most extensive series of cases in which a particular form of treatment was contrasted with another, is that given by F. E. Hare. Of 1828 consecutive cases treated during the years 1882 to 1886 in the Brisbane General Hospital, Queensland, by the '*expectant*' method, 271 died, a fatality of 14·8 per cent. This is about the average fatality in most places under this form of treatment. Of 1902 consecutive cases treated in the same hospital during the years 1887 to 1896 with *cold or tepid baths*, 143 died, a fatality of 7·5 per cent. The variation in fatality in the first group was from 13·3 to 17·0 per cent, whereas in the second it was from 1·3 to 11·3; that is to say, the highest annual fatality amongst the patients treated with baths was lower than the lowest of those who underwent the 'expectant' method. These figures are strikingly in favour of the bath treatment. I cannot bring forward so large a series of cases; but, from my clinical experience, I am persuaded that the bath treatment is better than any other of those which have been given a fairly extended trial; and that, other things being equal, the prognosis is more favourable in cases which are bathed than in those which are not. But the bathing must be commenced fairly early in the disease.

The evidence as to the value of the specific methods of treatment by *antityphoid serum* and *vaccines*, including Besredka's sensitized vaccines, is still somewhat conflicting, though on the whole it is in their favour. Thus, among 1120 vaccine-treated cases collected by Callison and Walters, there were 71 deaths, a fatality of 6·3 per cent. Petrovitch (Serbia, 1916) has reported 2270 cases, with a fatality of only 2·7 per cent, whereas the fatality of 1020 cases treated by ordinary methods was 12·8 per cent. Other observers record encouraging

results. On the other hand, Whittington was disappointed with 230 cases treated with stock vaccines. My own experience with serum, and with stock, autogenous, and sensitized vaccines, injected subcutaneously, is that their action is very uncertain. Now and again a case is met with in which the fever appears to be brought to an end in a few days, in rare cases, indeed, very abruptly in a few hours; but in most of the cases no beneficial result has been observed.

As regards the *diet* of typhoid patients, there is evidence to show that the more liberal scale introduced again of recent years conduces to a lower fatality and complication rate, and to a more speedy convalescence, than does the exclusive, or almost exclusive, milk diet. Thus, Coleman, of New York, writing in August, 1917, reports the results in 444 patients, half of whom were placed on a liberal and half on a milk diet. The fatality of the former was 8·1 per cent, of the latter 17·6. To obtain the best results, the diet-scale should be carefully planned so that the patient receives the equivalent of 3000 to 4000 calories a day in various food-stuffs, given in proper proportions.

Surgical Treatment.—I am not aware that, in respect of the complications, there is any one treatment that is of more certain value than another, except in the case of perforation and peritonitis. It has been stated above that this complication is extremely fatal, and that not more than 1 per cent of those who fall a victim to it recover. That observation applies to cases which are not treated surgically. There can be no question, now, that the patient's chances of recovery are considerably enhanced if the peritoneal cavity is opened and the ulcer which has perforated is sutured. While the reports of published cases show that hardly any case is hopeless, yet there is one condition which especially makes for success, and that is that the operation shall be performed as soon as possible after the perforation has occurred. A few hours' delay will make all the difference. Therefore the physician must be constantly on the watch for the symptoms of perforation, and must be prepared to call the surgeon to his aid, not only as soon as he is fairly certain that there is perforation, but even when he can go no further than to state that most probably it has taken place. By operating early, the acute general peritonitis that almost invariably follows perforation may be averted. It is true that the surgeon who makes a practice of operating early in perforation will occasionally meet with a case in which no perforation can be found, in which, indeed, no perforation has occurred; there may not even be peritonitis: experience, however, has shown that, in the majority of such cases, little or no harm is done; of 16 such cases reported by Gibbon, in Philadelphia, recovery took place in 10.

Another important factor which influences the prognosis of the operation for perforation is the condition of the patient at the time of operation. Those cases do best in which the patient has begun to convalesce when perforation has taken place; and the outlook is worst in those in whom it occurs during the height of the disease.

Still, no case should be looked upon as absolutely hopeless; and the only contra-indication to operation is a moribund state of the patient.

It is difficult to estimate the true recovery rate after laparotomy for perforation. Published statistics vary from about 8 to 50 per cent, but it is certain that more instances of successful than of unsuccessful cases are reported. The series which shows the best results is that published by G. E. Armstrong, of Montreal, in which there were 78 cases of operation, with 24 recoveries, a recovery rate of 30·7 per cent, an extremely good result. Gibbon has recorded 96 consecutive cases (in all of which perforation was found), with 17 recoveries, that is, 17·7 per cent. Of 107 consecutive cases operated upon in the hospitals of the Metropolitan Asylums Board during the nine years 1901 to 1909, 8 recovered, a recovery rate of 7·5 per cent. Only perforation cases are included amongst these. Armstrong's report does not state whether perforation was found in all his cases. The recovery rate is higher in cases of operation in which no perforation has occurred than in those in which it has occurred: in the latter case it probably does not exceed 20 per cent. But even the 7·5 rate quoted above is better than the 1 per cent of recovery in cases of perforation which are not submitted to operation.

Antityphoid Inoculation. The prognosis, both as regards protection from an attack, and recovery when attacked, is well illustrated by the figures which were published in May, 1913, by the Antityphoid Committee appointed by the Army Council in 1904. The committee investigated the histories of 19,314 soldiers, whose period of service abroad, in places where they were likely to be exposed to the infection of the disease, averaged twenty months. Of these soldiers, 10,378 were inoculated, and 8936 were not. The incidence of typhoid amongst the non-inoculated was 30·4 per mille, while amongst the inoculated it was only 5·39 per mille. In respect of the influence of inoculation on the severity of an attack, the committee investigated the histories of 258 cases of typhoid fever amongst these soldiers. Of these, 202 occurred in soldiers who had not been inoculated, and 56 in those who had been inoculated. The cases were divided into two classes, the mild and the severe (including the fatal). Amongst the inoculated men, 66·1 per cent belonged to the mild class, and 33·9 to the severe; while amongst the non-inoculated, 29·3 per cent belonged to the mild, and 70·7 per cent to the severe.

These figures may be supplemented by those derived from the experience of the present war. During the winter of 1914 and the spring of 1915, cases of typhoid fever, relatively few in number, appeared amongst the British troops in Flanders. Up to May 22, 1915, there were 827 cases. Of these, 508 occurred amongst the non-inoculated men, and 106 were fatal, a case-mortality of 20·8 per cent; while 319 occurred amongst the inoculated, and 22 were fatal, a mortality of 6·8 per cent. The incidence of attack was fourteen times higher amongst the non-inoculated than amongst the inoculated.

The British conclusions have been confirmed by the experience of antityphoid inoculation on a large scale in the armies of the United States, France, and Germany, especially the first of the three. Since the last quarter of 1911, antityphoid vaccination has been made compulsory for all persons in the military service of the United States under 45 years of age. The practice had been first employed on a small scale in 1909, and was voluntary up to the date just mentioned. Large numbers of men were vaccinated during 1910 and 1911. Before 1910 the number of cases of typhoid per mille of the mean strength varied from 3·1 in 1905 to 6·9 in 1902. In 1910 it was 2·4, in 1911 0·8, and in 1912 0·3, while for 1913 and 1914 it was less than 0·1. It is not certain, however, whether the whole of this improvement is due to inoculation.

E. W. Goodall.

TYPHUS FEVER.—The factors which must chiefly be taken into account in considering the prognosis in this disease are: (1) *The age*; (2) *The sex*; (3) *The habits and physical condition of the patient*; (4) *The occurrence of complications*; (5) *The presence of certain symptoms*; and (6) *Treatment*.

1. **Age.**—The influence of age is well illustrated in the following table compiled by Murchison, which shows the facts in respect of 18,268 cases admitted into the London Fever Hospital during the twenty-three years 1848 to 1870:—

FATALITY ACCORDING TO AGE.

Under 5	6·69	40 to 44	30·79
5 to 9	3·59	45 to 49	42·54
10 to 14	2·28	50 to 54	49·62
15 to 19	4·46	55 to 59	53·96
20 to 24	10·33	60 to 64	60·25
25 to 29	15·17	65 to 69	75·53
30 to 34	20·55	70 to 74	72·62
35 to 39	25·92	75 & over	85·71

The fatality for all ages was 18·92 per cent.

From this table it appears that the fatality is moderate below twenty years of age, and is indeed low in the age-group ten to fourteen. There is a very considerable increase in the fatality after nineteen years of age, and a constant rise for every decennium after that. The disease is extremely fatal after the fiftieth year.

2. **Sex.**—Murchison's figures go to show that on the whole the disease is slightly more fatal in males than in females, the fatality being 19·67 per cent for the one sex and 18·92 per cent for the other. The difference is most marked at ages over forty-five. In children

from five to fourteen the fatality is rather higher in females than males.

3. **Habits and Physical Condition of the Patient.**—The prognosis is unfavourable in very fat and in big, muscular persons, in those of intemperate habits, and in those who are the subjects of chronic diseases, especially of the kidneys.

The influence of pregnancy is shown by the following figures. Of 107 pregnant women who came under Murchison's care at the London Fever Hospital, 49, or 45·8 per cent, aborted about the tenth to fourteenth day of the disease; 9 of those who aborted died, but the remaining 98 all survived. From these figures it appears that if a pregnant woman is attacked by typhus, she is very likely to abort; and that if she does so, the prognosis in her case becomes worse.

4. **Complications.**—Murchison stated that, in his experience, death in patients under fifteen years of age was almost always due to some severe complication. Fortunately, however, complications are not very common in this disease.

Those most frequently met with are *bronchitis* and *hypostatic congestion of the lungs*, and the occurrence of the latter augments the gravity of the prognosis. *Laryngeal inflammation and ulceration* is a rare but very dangerous complication. *Suppurating buboes* of the neck (due to inflammation of the parotid and submaxillary glands and the surrounding tissue) are relatively common, and usually add to the severity of the attack.

5. **Special Symptoms.**—The following are unfavourable symptoms: an abundant rash with a large proportion of petechiæ; cutaneous hæmorrhages; hypostatic staining of the skin; cyanosis; hurried respiration; profuse perspiration at the crisis; a pulse-rate persistently over 120, especially in adults; pronounced nervous symptoms, viz., sleeplessness for three or four days, delirium (especially violent), convulsions, coma, coma-vigil, muscular twitchings, hiccough, contraction of pupils to a pin-point; extreme prostration; a notable diminution in the amount of urine; a presentiment of death. The earlier severe cerebral symptoms appear, the worse the prognosis. It is a favourable sign if at the end of the first week the temperature drops a little, and still more so if it does not rise again before the crisis. On the other hand, it is very unfavourable if the temperature keeps steadily high, and especially if it rises and keeps up during the second week. An abrupt rise to 105° F. or more, just before the crisis is expected, is of very grave omen. Relapses are very rare.

E. W. Goodall.

ULCERATIVE ENDOCARDITIS.—(*See* ENDOCARDITIS, ULCERATIVE.)

URÆMIA.—The prognosis in uræmia must always be guarded; as a general rule, it is very grave. Will the patient survive the immediate attack, and if so, will the condition recur?

In acute nephritis, when the patient exhibits all the phenomena of an acute inflammatory affection of the kidneys, with partial or total

suppression of urine, death may result from an initial convulsion: but if appropriate measures have been effective in controlling the convulsions, and if there be favourable response to further treatment, no more uræmic phenomena may develop, and the ultimate prognosis becomes that of an attack of acute nephritis, and may be entirely favourable.

In chronic nephritis, whether diffused or interstitial, the outlook is very serious. In the convulsive form, death may occur early from failure of heart and respiration during a convulsion, or the patient may die comatose after repeated convulsions. Even if temporary improvement takes place under treatment, recurrence of uræmia in some form is almost certain: and the prognosis is very grave, the fatal issue being, as a rule, only a question of weeks. When, in the uræmia of chronic nephritis, the onset of the nervous phenomena is gradual but progressive, the prognosis is immediately very unfavourable. The patient is, at first, merely dull and apathetic, possibly very irritable when roused: the kidney function is very deficient, and nitrogen retention is present. In a few days, apathy becomes more marked: the patient is difficult to rouse, and passes into coma: and a series of convulsions may precipitate the fatal issue.

Chronic uræmia, giving rise to alimentary symptoms, also justifies a very grave prognosis. The chronic nephritic who develops a dry, furred, cracked tongue, persistent vomiting, and possibly diarrhœa, is in a critical condition. In the dyspnœic form of uræmia, a fatal issue is probable; for even if there be favourable response to treatment, the kidney inadequacy is marked, and recurrence of uræmic symptoms is almost certain. Other phenomena of chronic uræmia, such as persistent headache, amaurosis, giddiness, paralytic phenomena, and marked insomnia, are all grave symptoms which point to pronounced deficiency of renal function.

Francis D. Boyd.

URETERAL CALCULUS.—(*See* KIDNEY AND URETER, CALCULUS OF.)

URETHRA, RUPTURED.—*The immediate mortality* of ruptured urethra depends upon two factors: whether extravasation of urine has taken place, and whether there are other grave injuries, such as fractured pelvis. Apart from these, there is no great danger at the time.

In 205 literature cases, uncomplicated by other injuries, Kaufmann gives the mortality as 14 per cent, but only 91 of these had an operation within two days; of these latter, 9 per cent died. The deaths were mostly due to extravasation: when this had occurred, 36 per cent were fatal.

Martens records 17 patients, 4 of whom had fractured pelvis, who were operated on at once, and only 1 died. This would be more in accord with modern practice.

The late result is an intractable stricture. In the older surgery this was almost inevitable, but early operation does much to ward off the danger. Rutherford reports 7 cases treated promptly by perineal section and suturing; 5 remained free from stricture for years, but 2

developed a narrowing. Cabot followed 5 operation cases for five years, no stricture following.

REFERENCE. Thomson Walker, "Ruptured Urethra," *Burghard's System of Operative Surgery.* *A. Rendle Short.*

URETHRAL STRICTURE.—One of the axioms of the older surgery was, "Once a stricture, always a stricture," and it has even been suggested by a famous surgeon that maxims of this sort should be framed and hung up to adorn the walls of hospital wards instead of the texts which used to be customary! To-day, the axiom is not quite true.

Urethral stricture may come on at any time after an injury. It follows gonorrhœa at one of two periods, the first about two to four years after the attack, and the second between ten and sixteen years after. Traumatic strictures are usually worse than those due to gonorrhœa.

The dangers to which stricture may give rise depend entirely upon the willingness or unwillingness of the patient to allow proper treatment. Granted a willing patient, stricture need never cause any severe symptoms, except in old, neglected cases of long standing, and in a few of the worst of the traumatic strictures. In a careless or timid patient, of course, a long string of troubles may follow—attacks of retention, peri-urethral abscess, perineal fistula, cystitis, epididymitis, extravasation of urine, rupture of bladder, and septic pyelonephritis. Any of the last three may end fatally. A patient with stricture is in danger of his life when the urine is very foul, when rigors and fever follow attempts at instrumentation, or when the bladder remains full for days. Too rapid emptying, in such a case, will often lead to death from suppression. Other signs of renal infection are a fall in the urea output, wasting, sweating, thirst, and urinous odour of the breath.

Rupture of the bladder is a rare event in acute retention: more commonly the membranous urethra gives way, leading to extravasation of urine.

The Effect of Treatment.—*Rapid or continuous dilatation*, the routine treatment, is safe, except in patients whose kidneys are seriously involved, but it seldom, if ever, cures the stricture, and must be repeated at intervals of one to three months. Sometimes, however, it takes years for a well-dilated stricture to contract down sufficiently to trouble the patient much.

Internal urethrotomy is used by some surgeons where others would dilate. The mortality is about 1 per cent: of 1018 cases treated at St. Peter's Hospital, 0·78 per cent died, and of 4686 cases collected from the published records of various surgeons, 1·1 per cent died. In the great majority of cases well followed through, a subsequent dilatation will be found necessary at intervals of three to six months, but in rare cases it cures outright. On the other hand, a few patients need to have the operation repeated.

External urethrotomy seldom cures: it is now usually reserved for the

worst impassable strictures, and subsequent regular dilatation will be required. Sometimes the operation has to be repeated. The mortality in 100 cases at St. Peter's Hospital was 8 per cent (1895 to 1908), and older figures agree well with this.

Excision of the stricture is sometimes a perfect cure, but the results are not always very satisfactory in the bad cases on which it is usually tried. Its success greatly depends on whether the urine is clean or foul. Many cases of permanent cure are, however, quoted by Thomson Walker from the literature.

REFERENCE. Thomson Walker, "Stricture," *Burghard's System of Operative Surgery.*

A. Rendle Short.

UTERUS, CANCER OF. — Two distinct clinical conditions require consideration under this head: (I) *Carcinoma of the cervix*, in which the results are by no means favourable, the cures not exceeding 25 per cent of all cases; and (II) *Carcinoma of the body*—a comparatively rare disease—where, on the other hand, the results may be said to be good.

I.—CANCER OF THE CERVIX.

It is necessary to consider the outlook both from the clinical side and also in relation to treatment.

Now the prognosis at the present time turns not only upon whether the case is operable, but upon whether it is eradicable. Even its more enthusiastic advocates do not advise irradiation in all cases, although in certain instances the growth has disappeared and not recurred in over five years.

Prognosis in Relation to Clinical Conditions. The following points present themselves for consideration in any particular case: (1) The size of the growth; (2) Its extension; (3) The glandular enlargement; (4) The condition of the growth; (5) The general state of the patient.

1. *The size of the growth* is not *per se* a very good criterion as to operability; thus a comparatively large vaginal growth which is freely movable is sometimes seen, and merely indicates a slow-growing type—more especially in elderly patients; while a comparatively small cervical growth may yet be fixed. It is in relation to the degree of fixation that the size becomes important.

2. *Extension of the growth* superficially along the vaginal surfaces is fortunately not common, but when present it usually indicates some involvement of the wall of the bladder or rectum, so that such cases are no longer suitable for radical operation. Unfortunately, too, rays and radium, when applied to these cases, frequently give rise to fistulous openings.

As regards thickening, or apparent extension into the pelvic tissues in any direction, one must be careful to recognize that early fixation is an inflammatory process of a chronic nature, representing septic absorption from the growth, and practically always preceding an

extension of a growth. Clinically there is nothing more difficult than to decide whether the fixation present, be it to bladder, rectum, or pelvic wall, is inflammatory or malignant. In many cases the doubt will only be solved by an exploratory laparotomy with attempted removal of the uterus.

Thickening in the broad ligament, if well marked and extending right out to the pelvic wall, is likely at any rate to contain malignant cells in the portion adjacent to the ureter, and therefore more reliance is to be placed upon consolidation of the base of the broad ligaments. However, even in these cases the ureter may escape invasion, and be dissected out from a mass of growth during operation. It is probable that the rhythmic waves of contraction serve to protect it against invasion. The prognosis in such cases is not good, but life may be prolonged and made more comfortable by operative measures. Farrar Cobb[1] records a case in which the ureter was dug out, and the patient was alive and free from recurrence thirteen years later.

3. *The glandular enlargement* is only occasionally to be detected on examination. As a rule it is only noted during operation, and then as more commonly affecting the iliac and obturator group of glands. The enlargement of the lymph glands must not be taken as in all cases indicating malignant metastasis. Thus, some enlargement of the lymph glands is present in 90 per cent of cases, but evidence of malignancy, even after microscopical examination, only occurs in 15 to 20 per cent of cases operated upon.

4. *The condition of the growth* will often explain the cachexia. Foul, ulcerating growths, both by reason of the associated hæmorrhage and the septic absorption, lower the resistance of the patient, so that the shock of an extended operation may prove too severe, or during convalescence a cystitis or pyelitis may determine a fatal issue.

Another serious risk is that during operation the peritoneum or operation area may become infected from the septic cervical growth, and so cause an acute peritonitis or a deep pelvic abscess. Probably at least 20 per cent of all deaths are to be attributed to this cause.

5. *The general condition of the patient* is often too readily dismissed with a cursory examination. Thus, until recently it was customary to regard a cachectic state as an indication of advanced growth, while another patient, fat and healthy looking, was considered as being probably in a less advanced condition. But this is by no means generally true; for the post-mortem records of cancer institutions show that not more than 50 per cent of the cases of cancer of the cervix die in a cachectic state, while the remainder are well covered, and in many cases even fat. Now in many of these latter cases the cause of death has been an ascending pyelitis supervening on a hydronephrosis and dilated ureter or ureters, the result of lateral extension of the growth. It is evident that cachexia is merely an accident of the disease, depending upon septic infection of the growth. Consequently in judging of the risk of operation and the chances of complete cure a careful examination is required which shall include investigation as

[illegible]

[illegible] to the [illegible] conditions of the tissues of [illegible] and [illegible] the [illegible] method of [illegible].

Further, it is to be remembered that a certain degree of fatness [illegible] considerations for the chances of complete extirpation and [illegible] the [illegible] of injury to the bladder or bowel, and also [illegible] the immediate arrest of hæmorrhage during the [illegible] procedure.

Nevertheless, it yet remains true that [illegible] well-marked [illegible] such as spinal conditions of long growth, the prognosis is not good.

Prognosis Apart from Treatment.—Apart from treatment the [illegible] [illegible] years. Death may be due [illegible] and [illegible] of hæmorrhage. Sometimes the patient's end is less merciful, and the scene is only terminated after months of pain [illegible] bladder and rectal troubles. Peritonitis or pyæmia [illegible] occasionally put a [illegible].

Prognosis in Relation to Treatment.—The results of treatment by [illegible] operation vary within certain limits according to the selection of cases, the extensive nature of the operation, and the removal of [illegible] tracts. Speaking generally, it may be said that a careful selection of cases will show a high percentage of cures amongst those operated upon; but the percentage will be low if all the cases seen are included; and if an extensive operation is performed, the immediate mortality is usually high.

As to operability. Mayer,[2] in a large series of cases between 1902 and 1905, condemned 35 per cent. as inoperable. Thus 65 per cent. of operability represents a fairly average figure; but an idea of the variation may be gauged by the fact that many surgeons at the present day condemn 60 per cent. as inoperable. In the Massachusetts General Hospital the surgical staff rejected 230 cases out of 367, or 62·4 per cent. as unfit for radical operation; and Farrar Cobb[1] records that he operated on 3 cases condemned as inoperable by other men, with the result that 2 were cured and the third died of recurrence nearly two years later. With many patients it may be said that it is impossible to decide without an exploratory laparotomy and attempted operation whether a case is operable or not; and as an instance, Farrar Cobb[1] quotes a woman alive and free from growth in whom, fourteen years before, he had 'dug' the ureter out of the parametrium with death during the course of operation. The percentage of operability with the most expert surgeons now reaches 75 to 80 per cent. of all cases.

As to the type of operation, in so far as 'cures' are concerned (that is, cases free from recurrence five years after operation), there is no doubt that the radical method known as Wertheim's hysterectomy has precedence of place; unfortunately the immediate mortality is still high, although tending to diminish. Operation by the vaginal route is largely practised by Schauta. We subtend figures comparing the results of Wertheim and Schauta, from which it will be seen that

the operative mortality in expert hands for the more extended abdominal operation need not be greater than that for the vaginal operation while the end-results are much better, and the number of cases which are operable by the abdominal method exceed those operable by the vaginal route.

It would be easy to multiply statistics in which the literature of recent years abounds; but the figures of Wertheim and Schauta represent the results of two specialists employing their own operative procedures, while the figures of Mayer, who used both methods, are more representative of the average results to be expected. It must be remembered that the two methods are not entirely antagonistic, for in certain cases, especially in fat patients, and in special instances of lesions in other organs, the vaginal route offers the best chance of recovery and cure.

Except in the presence of exceedingly early growths, hysterectomy is the only operative measure to be adopted. No less extensive procedure can be justified by its results.

RESULTS OF RADICAL OPERATION FOR CANCER OF THE CERVIX.

Wertheim[3] (abdominal)	500	19·4*	- -	250	57·6
Schauta[4] (vaginal) -	498	8·8		258	37·9
Mayer (both) - -	118	20·9	46	[illegible]	28·9

Palliative Treatment (including *x* rays, radium, and mesothorium).

Irradiation cannot as yet be regarded as anything but a palliative measure, although it has resulted in some cures in isolated instances. The treatment is still of recent date, and the cases are comparatively few in number.

Bumm[4] well illustrates the effects of irradiation. He has obtained the uterus in five cases at varying periods after treatment. In each case some focus of disease remained, although in two of them it was only microscopically detectable. In the majority of cases the results depend upon the type of growth—that is to say, with a superficial papillomatous mass an excellent result will be obtained, simulating, if not actually producing, a cure; while in penetrating growths the external appearance of the cervix and the relief of symptoms will suggest a cure, but the growth proceeds in the depths and in the lymph tracts. The best results will be obtained where the cervix is curetted before applying the radium, so as to get greater and more widespread radiant effect.

A disadvantage of the treatment, as acknowledged by [illegible] and Bellot, is that there is a tendency to the production of fistulæ when

the growth has already invaded the vesical or rectal wall. Also there is often frequency of, and pain on, micturition, or rectal tenesmus, after the application.

Finally, it must be said that in inoperable cases both radium and mesothorium offer very good palliative treatment. Relief of symptoms and the effect on the growth itself are most marked. Unfortunately, facilities for such treatment are limited owing to the expense.

Of other palliative measures it is only necessary to mention two procedures.

The use of the curette is often most beneficial in its effect, especially with the slow-growing superficial tumours. It helps to clear the growth, and formerly it was much more extensively employed. Whenever possible, however, radium is preferable.

Ligation of the internal iliac arteries for the continuous hæmorrhage has in many instances caused complete relief from the bleeding, and the diminished blood-supply has seemed occasionally to retard the growth.

II.—Cancer of the Body of the Uterus.

This is a comparatively rare disease, but the end-results are very much superior to those of malignant disease of the cervix. The frequency of the disease may be gauged from the fact that in 248 cases of uterine growth recorded by Mayer, only 37, or 14·9 per cent, were localized in the body.

Prognosis from the Clinical Aspect. As a rule there is little in this respect upon which to base an opinion as to the outlook. In the first place, the diagnosis is frequently obscured by the presence of fibromyomata, to which are accredited the symptoms of the disease; in the next place, the symptoms and the knowledge to be gained by bimanual examination, together do not furnish sufficient information for the recognition of growth in the majority of cases.

Certain features may be taken as indicating advanced growth, and therefore limiting the chances of eradication. The size of the uterus, in the absence of myomata, is a distinct index of the extent and amount of the neoplasm. Again, a mass outside the uterus may indicate a metastatic nodule affecting the appendages or pelvic structures; but it is not to be invariably taken as of serious import; because, in perhaps the majority of cases where such a mass exists, it is of inflammatory nature, and results from extension of the septic infection from the uterine growth.

Another clinical feature of some importance is the character of the discharge. Excessive bleeding, through the resulting anæmia, obviously detracts from the safety of undertaking operation. A foul discharge is still more important, both on account of the septic absorption which goes on, and from the risk of spreading the infection during operation. Infection of the peritoneum, and of the operative field generally, probably accounts for the greater part of the operative mortality.

Prognosis in Relation to Treatment. The results of treatment are those of total hysterectomy, no other measure is to be recommended. If, however, it happens that a small growth affecting the body is discovered by the pathologist during examination, and in many such cases a subtotal hysterectomy only has been performed, in such cases it must be decided whether the margin of healthy tissue between the growth and the point of resection is sufficient to justify the risk of leaving it in situ. There are no precise, but reasonable, data from general experience of cases, but it may be said that such a procedure appears comparatively safe. The presence of large fibroids render the vaginal operation unsuitable in many cases.

Mayo[illegible] in 1906 operated on 26 cases with the following results: 3 (11 per cent.) died from operation; 7 (26·9 per cent.) showed recurrence; and 13 (52 per cent.) were cured well. Dodebeur quotes Schauta as obtaining 88·8 per cent. of cures, and states that the chief danger is infecting the abdominal peritoneum with either septic matter or new growths. Lindig quotes Kroemer as recording 81 per cent. of recoveries in 16 cases. From a table which follows it will be seen that the results of treatment in cancer of the body of the uterus are relatively good.

[illegible] *Br. Med. Journ.* Nov. 1914, [illegible] *Br. Med. Journ.* Nov. 1914, [illegible] *Br. Med. Journ.* Dec. 1914, [illegible] *Br. Med. Journ.* Feb. 2, [illegible]

B. [illegible] G. [illegible]

UTERUS FIBROIDS OF. The prognosis is influenced by so many factors, that each case must be considered as regards its peculiar features. The subject may be discussed under two heads: (I) *The prognosis from the clinical point of view*; (II) *The prognosis in relation to treatment.*

I. Prognosis in Relation to Clinical Features

Many women have small fibroid nodules of the uterus which, being symptomless, are either overlooked or only discovered by accident during the course of an examination, or post mortem. It is estimated that 20 to 50 per cent. of women who reach the age of forty years show fibroid tumours in the uterus.

Risks due to the Presence of a Fibroid. The possessor of a fibroid may be said to incur the following risks in varying degree: (1) Enlargement of the fibroid; (2) Degenerative changes in the tumour; (3) Excessive menstrual loss; (4) Extrusion of the tumour; (5) Inflammatory changes; (6) Pressure symptoms; (7) Increased chance of carcinoma of the body of the uterus; (8) Abnormal conditions in pregnancy and labour.

The degree in which these risks are incurred is difficult to estimate. When the patient is approaching the climacteric and the tumour is small, and more particularly if it be intramural in position, the chances of any of these ill effects are slight. When, however, the patient is relatively young, under forty years of age, the period is

time that intervenes before the menopause considerably increases the liability to certain of these risks.

1. *Increase in size* of a tumour is usually slow, but may in certain circumstances be rapid. It will then be difficult to decide whether the increased size is due to mere rapidity of growth or to degeneration.

2. *Degenerative changes* as a rule cause enlargement of the tumour, but except in the case of 'red degeneration' give rise to little anxiety. Thus, almost the only consequences of œdematous, myxomatous, or cystic degeneration are an increase of pressure symptoms.

'Red degeneration' is a more serious condition which, from the peculiar symptoms and the frequent association with pregnancy, must often be a source of worry. The frequency of the condition, as estimated by Noble[1] in 2274 cases, is 4·7 per cent; but this figure is probably high. If treated surgically, the results are uniformly good. If untreated, the end-results may be suppuration, or, in the case of subperitoneal tumours, a localized peritonitis with adhesions to bowel or omentum. Eventually many of the tumours become calcareous.

Sarcomatous degeneration of a fibroid, according to Noble,[1] occurs in about 1·5 per cent of all the tumours removed by operation, but is less frequent if all the cases are taken into account. In calcareous degeneration there is an actual shrinkage of the tumour, and therefore a relief from symptoms may often be expected.

In general it may be said that the liability to symptoms arising from degenerative changes are in direct ratio to the size of the tumour and the relative youth of the patient.

3. *The chances of the menstrual loss becoming excessive* depend almost entirely on the situation of the tumour. Subperitoneal fibroids, because they do not encroach on the uterine cavity, have but little tendency this way. Even, however, when the tumour felt is obviously in this situation, it is impossible to exclude the chance of some smaller tumour being present more nearly in relation with the endometrium. Indeed, since it is rare to find a single tumour, it may be argued that where one large mass can be felt—whatever its position—it is pretty certain that one or more other tumours exist, too small for recognition, but such, by their possibility of subsequent growth, render the supervention of menorrhagia not unlikely, although at the moment no such symptom may be present. The haemorrhage due to a fibroid is rarely directly fatal nowadays, because the case comes to operation before such a disaster has time to occur. It does occasionally still happen, however.

Indirectly, the severe menorrhagia is responsible not only for many of the fatalities, but also for many of the hardly convalescences, that follow operation. The intense anæmia induces a generally enfeebled state of the tissues, and particularly of the heart muscle, with consequent cardiac dilatation. It is amongst this class of patients that most of the deaths following the removal of fibroids are found, the final result being due to exhaustion, sudden cardiac failure, or pulmonary embolism. Further, the anæmic state of the patient tends to

favour the occurrence of venous thrombosis, with its attendant risk of pulmonary embolism. Post-operative femoral thrombosis, when it occurs, is nearly always seen in intensely anæmic patients. Apart from the risk of pulmonary embolism, this complication delays recovery for from six weeks to three months. The left leg is the one usually affected.

4. *Extrusion of a fibroid* may take place in one of two ways. In the first, a submucous tumour practically becomes polypoid and is pushed through the cervix, a process associated with smart hæmorrhage and sometimes with pain. In the second, a sessile submucous tumour becomes inflamed and sloughs, the capsule of endometrium covering it gives way, and the mass, often in a pultaceous and stinking condition, is forced out of the uterus. This process is one associated with symptoms of more or less acute sepsis, and is one of considerable danger.

The liability to these happenings is obviously dependent upon the situation of the tumour in the first instance. Further, they are comparatively rare below forty years of age. The consequences are hæmorrhage and septic absorption; but the chief danger arises when such tumours are removed by the abdomen, when the chance of infecting the peritoneum is serious.

5. *The chances of inflammatory changes* or changes leading to inflammation—taking place in or around the tumour are definite, for in a considerable proportion of the cases operated on such an event has occurred. Thus, salpingitis is quite commonly found, usually of the sclerotic or hydrosalpingitic variety, but occasionally the tubes contain pus. Another not uncommon condition to find is hæmatosalpinx, usually on both sides. The liability to salpingitis is increased if the patient has undergone intra-uterine treatment, such as curettage, electrolysis, ionization, and so forth, and also if pregnancy occurs, since fibroids increase the chances of sepsis during the puerperium.

Pedunculated fibroids may undergo axial rotation, but this is a much less common event than is the case with ovarian cysts.

6. *The chances of pressure symptoms* developing depend upon the situation of the tumour. When it is low down, and especially when it is growing from the supravaginal cervix, such symptoms are very common; when it is situated in the upper part of the uterus they are less likely.

Most patients with fibroids in the uterus experience more or less frequency of micturition. Cervical fibroids, if impacted in the pelvis, cause retention of urine. Similarly, a fundal tumour may cause the uterus to retrovert and become fixed under the promontory, with a like result. The ureters, strangely enough, are rarely pressed upon.

Acute intestinal obstruction may be caused by a fibroid—rarely by simple impaction in the pelvis, much more commonly by inflammatory adhesions.

7. *The presence of a fibromyoma in the uterus undoubtedly predisposes to carcinoma developing in the corporeal endometrium.* It is found

that carcinoma of the corpus is associated with fibroids in 4 per cent of cases. The exact degree of risk that a patient runs in this connection is impossible to estimate, and it must be remembered that corporeal carcinoma is not a common disease under any circumstances. The possibility of this change supervening should always be borne in mind when the regular periodic hæmorrhage of a fibroid uterus begins to give place to irregular or constant loss.

Carcinoma of the cervix is rarely (0·7 per cent of all cases) associated with fibromyomata, since the latter are common in sterile women and the former is more particularly associated with fertility.

8. *With regard to pregnancy and labour*, the question of fertility in relation to fibroids constantly calls for decision. These tumours are frequently associated with sterility. Findley[1] states that 30 per cent of myomatous women are sterile, as opposed to a 10 per cent rate for the female population in general. The sterility may be due to the fibroid itself obstructing the meeting of sperm and germ, or to some endometrial change.

If conception occurs, there is an increased chance of miscarriage, but not to the extent that might be thought, because in such cases the fibroids are often subperitoneal in position and do not interfere with the uterine development.

Pregnancy tends to an increase in size, often more apparent than real, of the fibroid tumour. There is also an increased liability of the tumour to undergo degeneration and softening. Allusion has already been made to the frequent association of 'red degeneration,' which may require surgical treatment.

The risks during labour depend on the situation of the tumour: masses low down will obstruct delivery and necessitate surgical measures, but when superficial and growing from the upper part of the uterus, no ill results may follow. There is, however, an increased risk of post-partum hæmorrhage in all cases.

During the puerperium a fibroid may inflame, necrose, or be extruded. These events are fraught with grave risks to the patient. If in the course of a difficult delivery the tumour has been bruised, septic necrosis is likely to follow.

It will thus be seen that the possession of a fibroid tumour very definitely increases the risks of child-bearing. On the other hand, the various complications that may arise in the course of pregnancy, labour, and the puerperium can in most cases be foreseen, or at all events watched for, and if treated early can be successfully overcome.

II.—Prognosis in Relation to Treatment.

Operative Treatment.—This is the course to be advised in the vast majority of fibroids giving rise to symptoms, for not only is it the only certain method of cure, but it is also the quickest, and in the long run the least expensive.

Abdominal hysterectomy will be first of all referred to. The surgery

of these tumours has been so greatly reduced of recent years that the average mortality of the most radical procedure, hysterectomy, is probably not much over 1 per cent in expert hands, no greater in fact than that of appendicectomy at the present period.

Each case must, however, be considered on its own merits. Hysterectomy is, in many cases, a perfectly straightforward operation, one that may be performed "by the book" even by an operator of very little experience. But, on the other hand, it may be an extremely formidable undertaking, in which the question is to whether an expert or a novice is to perform it, makes all the difference in the prognosis. No one who is not fully competent to carry, through successfully the most difficult case, should undertake this class of surgery at all, but it is often impossible to gauge beforehand the degree of difficulty that will be met with.

The operation of subtotal hysterectomy, the cervix being left behind, is the one most generally applicable to cases of fibroids. It is considerably easier than the total operation, especially in the more complicated cases, and if the cervix is healthy there is no good reason to remove it.

The total operation should be reserved for special cases where the cervix is unhealthy, the uterus above it carcinomatous, or where vaginal drainage is desired.

In either operation the ovaries should be conserved if they are healthy, or if this is not possible, then one, or at least part of one, should be left behind. The ovarian function continues uninjured after hysterectomy, and in this regard the patient is no worse off than other women.

Patients often ask what effect removal of the uterus will have on their nervous system and upon sex feelings and intercourse in particular. The answer is that the operation leaves them in this respect unaltered. Child bearing is of course impossible, but with this restriction marriage is able to be entered upon without any drawback.

The risks of the operation are of course increased if the patient is complicated by one or other of the superposed conditions that have been referred to. Of these, septic infection and pneumonia are the most dangerous.

In the case of a patient very ill with a fibroid tumour, the objection to an operation is frequently made that she is too weak to undergo it. The reply is that she will not get stronger by waiting, and that the difficulties of the operation will certainly increase.

In conclusion, as illustrative of the results of hysterectomy, we quote the returns for 1912 and 1913 at the Chelsea Hospital for Women, representing all the cases operated upon by the various members of the staff.

Total hysterectomy for malignancy: 21 cases, no deaths. Subtotal hysterectomy for fibroids (with or without complications such as diseased appendage or appendages, ovarian cysts, etc.): 203 cases, 1 death.

These figures represent the result in expert hands under good conditions. They are therefore good; but they are the results of operations by all the members of the staff, and may in consequence be taken as an index of what is easily realizable.

Myomectomy, with the conservation of the uterus, offers in certain cases a useful treatment in certain instances. The object is to allow of pregnancy for the supervention of pregnancy, and to maintain the menstrual function. With regard to the latter point it may be said that, as in many cases of myomata the patient seeks treatment from the surgeon for the cure of excessive menstrual loss, myomectomy in many instances does not offer a complete cure, because the operation leaves behind a much hypertrophied uterus from which a continuance of the menorrhagic symptoms is not unlikely. The prospects of future pregnancy would not appear to be great, as it is generally believed that not more than 10 per cent of these patients subsequently conceive. Reliable statistics are, however, unknown to us.

It is likely, nevertheless, that in competition with radium, myomectomy will be more extensively performed. The fact remains, however, that myomectomy is limited to special cases where the tumours are not abundant, where menorrhagia is not marked, and where the uterus itself is not hypertrophied.

The mortality in expert hands is low. W. Mayo[3] reports 1 death in 157 cases of myomectomy in the last decade.

Vaginal operations are sometimes called for. Vaginal hysterectomy is now seldom employed; no radical operation by this route is advisable.

The removal of a fibroid polypus is a simple procedure without practical risk.

Large tumours are sometimes best removed in this way, especially sloughing submucous fibroids, for in such cases the profound sepsis makes an abdominal operation undesirable if it can be avoided.

Curettage as a cure for fibroid menorrhagia is not to be commended. It carries with it a definite risk of infection of the tumour, and in any case its effect is merely temporary.

Irradiation.—Recently many cases of fibroids have been treated by γ rays or by radium, and good results have been claimed; but sufficient time has not elapsed to prove their permanence.

There are certain classes of cases in which such treatment is absolutely contra-indicated, namely, where the nature of the tumour suspected of being a fibroid is not certainly known, where inflammatory signs, or signs of incipient malignant disease, are present, and where urgent symptoms due to pressure or degeneration have declared themselves.

Irradiation seems to act by destroying the function of the ovaries and inducing a premature menopause, with its attendant train of symptoms. As such, it is undesirable in relatively young patients. The treatment takes some weeks to carry through, and though the menorrhagia would appear to be cured in many of the cases, and the tumour made to shrink in a lesser proportion, absolute disappearance of the

mass does not occur. The patient, therefore, cannot be considered as cured.

In the light of our present knowledge, therefore, the treatment by irradiation must be considered quite inferior to the surgical removal of the tumour.

Having regard to the interest now attaching to this form of treatment, it will be well to give some figures of results taken from recent literature of the subject.

As regards *x* rays, Birdsall[1] quotes the following statistics collected by Holding: Of 667 cases, 56 per cent were considered cured, 31 per cent improved, 11 per cent unimproved, and 2·03 per cent died. Marck[5] gives the following figures: Of 16 cases, 9 were cured, or 56 per cent; 4 were better, or 25 per cent; 3 were unimproved, or 19 per cent; only in 3 cases was a diminution in volume recognized.

As regards radium, Kelly and Burnam[6] treated 21 cases in this way: in 2 the tumours disappeared, while the menstrual periods persisted regularly; in 1 the treatment failed, and operation was undertaken; in 1 inflammation occurred, and an abscess formed; in 6 the tumour apparently disappeared; and in 13 the tumour was reduced in size.

Palliative and Expectant Treatment.—This is based on the chance of the tumour shrinking in size and ceasing to give rise to symptoms after the menopause. The likelihood is shown to be much less than was formerly supposed.

Fibroids prolong menstrual life, and the menopause is frequently not attained till the patient is well over fifty. After the cessation of the periods, the tumour does slowly shrink in a fair proportion of cases; but in others it continues to grow, or remains stationary. So long as it is present, the possibility remains of some complication supervening, and operations on elderly women have commonly to be performed on this account. The period of the menopause and after would indeed appear to be that in which degeneration, inflammation, and malignant change are most common.

The mortality in expectant treatment is estimated at 30 per cent.

References. [1]Findley, *Diseases of Women*, 1914, 586; [2]Chelsea Hospital for Women, 42nd and 43rd *Annual Reports*; [3]*Surg. Gyn. and Obst.* 1911, Feb.; *Med. Rec.* 1914, May, 892; [5]*Wien. klin. Woch.* 1914, May, 745; [6]*Jour. Amer. Med. Assoc.* 1914, Aug. 22.

Bryden Glendining

UTERUS, RUPTURE OF.—The outlook in rupture of the uterus must still be regarded as very serious, as less than one in four cases recovers at the present day. Recent figures, however, show a vast improvement in results, the mortality being reduced by half, and this improvement is largely due to a revolution in treatment.

It is important to bear in mind that, although the gravity of uterine rupture is thought to be due to the ensuing hæmorrhage, yet it is rarely that such hæmorrhage is sufficient to cause immediate death. Thus the majority of deaths occur between three and twelve hours after

the time of rupture—when the shock has to some degree passed off and further oozing occurs. Hæmorrhage proved fatal in 42·8 per cent of the cases occurring in the Moscow Maternity Hospital in a series collected by Ivanoff.[1] In at least 50 per cent of cases a dangerous hæmorrhage occurs, but it is not necessarily fatal.

On the other hand, the part played by septic infection in these cases is very considerable; it is estimated that 37 per cent, or according to Eden[2] 50 per cent, succumb from this cause.

It is thus seen that hæmorrhage and sepsis are much more serious than shock, which accounts for a small number of deaths.

Although the tendency of the present day is to ignore to some extent the division into complete and incomplete rupture of the uterus as regards method of treatment, yet it will be well to retain the grouping when considering the prognosis.

Incomplete Rupture.—The prognosis is influenced by (1) The extent of the rupture; (2) The stage of parturition; and (3) The conditions under which it has occurred.

1. *The Extent of the Rupture.*—Ruptures involving only the lower segment present a much better outlook, in that the hæmorrhage is readily controlled by packing, and there is no risk of internal bleeding. The chances of septic complications are also considerably less. On the other hand, where the rupture extends well up the uterus to the peritoneal reflection, the condition is, speaking generally, just as serious as in the complete variety, and the prognosis differs little from what obtains in that condition, except that direct peritoneal infection is excluded. The hæmorrhage in these cases is often subperitoneal, and has been known to extend extraperitoneally as high as the kidney. Klein[3] collected 30 cases in which extraperitoneal hæmorrhage occurred in this way, with a mortality of 70 per cent.

In many of the more extensive ruptures of the uterus it has been found that considerable difficulty was experienced in recognizing, by digital examination, whether the peritoneum was actually torn or not.

2. *The Stage of Parturition.*—In ruptures occurring before the final expulsion of the child, or while the placenta yet remains undelivered, the expulsion of the afterbirth will certainly increase the risk of further hæmorrhage; and should manual removal be necessary, the manipulations may almost unavoidably increase the extent of the tear.

3. *Conditions under which Rupture Occurs.* These are important in many ways. For instance, rupture of the uterus frequently occurs while turning the child for some malpresentation, such as a prolapsed arm. In this instance the presenting part will have been returned to the uterus, and the operator's hand will also have been introduced—under such circumstances it is difficult to exclude the risk of sepsis.

Again, in cases where rupture is spontaneous, which is rare in the slighter incomplete forms, the outlook is good once the hæmorrhage

[illegible] stopped. In these cases equally good results are claimed both by those who favour douching with drainage, and by those who assert that packing with gauze is essential.

Complete Rupture and Large Incomplete Ruptures. The factors which enter into consideration in these cases are somewhat different, and may be considered under the following headings: (1) The amount of hæmorrhage; (2) The facilities for operative procedure; (3) The treatment adopted.

1. *The Amount of Hæmorrhage.* This must to a large extent be judged by the condition of the patient. It is to be remembered that the bleeding is almost entirely intraperitoneal, except in the incomplete variety, where it is largely extraperitoneal. A factor which seriously complicates the problem in these cases is the estimation of the accompanying shock. It will be found that blanching is of more value as an indication of the amount of hæmorrhage than the actual state of the pulse. The most reliable information is to be gained from a consideration of the condition of affairs in the pelvis. In a uterus from which both the fœtus and the placenta are delivered, either externally or into the peritoneal cavity, and which has contracted down firmly, the amount of bleeding is not immediately dangerous. On the other hand, in a uterus still occupied by the placenta, the hæmorrhage must always be serious; it is to be remembered that the more serious bleeding is the secondary hæmorrhage or oozing that takes place after shock passes off. Some idea of the effect of hæmorrhage is seen in Ivanoff's series of 124 cases in the Moscow Maternity Hospital, where hæmorrhage proved fatal in 42·8 per cent; while in the Bucharest Hospital it was fatal in 24 per cent.

2. *The Facilities for Operative Procedure.* While there are a certain number of cases in which the hæmorrhage is rapidly fatal, yet, if in the remainder effective surgical measures could be adopted within a short time, the mortality would be small. The necessity in the majority of cases of waiting until operation can be undertaken, or of transport to a hospital, has in many instances been disastrous.

Further, while to the experienced gynæcologist there is nothing inherently difficult in the operative treatment of rupture, to any one not so practised the altered relationships of the parturient uterus increase considerably the operative risks, both by reason of the possible damage to the neighbouring structures and by the [illegible] operation. Therefore the absence of operative facilities and of an experienced obstetric surgeon militate against the chances of recovery.

3. *The Treatment Adopted.* The results of operative treatment are so very much better than those of any expectant method, that the latter can only be justified in very exceptional circumstances.

Of operative procedures, the question resolves itself into deciding whether the better results are to be obtained by securing the bleeding point and repairing the rent, or by hysterectomy. It would be thought that the simpler procedure would give the better results.

but when it is remembered that somewhere about 45 per cent. [illegible] die of sepsis, the risks that [illegible] in leaving the uterus behind [illegible] considerable. A more remote effect [illegible] on the subsequent history the liability to a second rupture. [illegible] collected 15 cases in which a second [illegible] occurred, with a mortality of 53 per cent. Again, it has happened [illegible] to difficulty in suturing the rupture, further bleeding has been [illegible]. On the other hand, in a perfectly clean case where fertility is desired and the conditions are favourable, the simple repair [illegible] a very good prognosis.

However, hysterectomy, and especially abdominal hysterectomy, will offer the best chance in the majority of cases. Its efficacy in direct control of hæmorrhage, which is obtained, and the elimination to a great extent of [illegible] of the uterus and the [illegible] hysterectomy has not been performed extensively, but Kolomnin has collected 3 cases with 1 death, and Klein 7 cases with [illegible].

In [illegible]

Some of the most reliable are those collected by Kolomnin, which represent cases treated in spasmodic instead [illegible] conditions may be said to have been most favourable. Of 149 [illegible] 97 were treated conservatively, with a mortality of 61 per cent. [illegible] were treated by hysterectomy, with a mortality of 36 per cent.

Tarnier[1] between 1885 and 1897 treated 14 cases by packing, douching, etc.: 10 died. Between 1897 and 1902 he treated 12 cases: 6 died before operation could be done, 3 died after operation, 3 were cured.

Blacker[6] treated 8 cases: 3 were operated on—all recovered; 2 did not admit of treatment—both died; 3 were plugged with gauze—2 died, 1 recovered.

REFERENCES. [1] *Ann. de Gyn. et d'Obst.* 1904, lxi, 449; [2] *Proc. Roy. Soc. Med. (Obst. and Gyn. Sect.)*, 1909, May; [3] *Arch. f. Gyn.* 1901, lxii, 2; [4] *Ann. de Gyn. et d'Obst.* 1901, 249; [5] *Monats. f. Geb. u. Gyn.* 1903, xvii, 345; [6] *Lancet*, 1912, Jan. 13.

Bryden Glendinning.

VARICELLA.—(*See* CHICKEN-POX

VARICOCELE.—This anatomical defect is extremely common in young men, and the great majority of them never suffer any inconvenience from it. In a small proportion, however, it causes aching pain which may be quite severe. Many patients are very apprehensive that it will lead to sexual disability or other ill effects, and it appears to be true that the testis on that side may be smaller and softer than the other, but it is practically unknown for any interference with function to result. Except in rare cases of malignant growth of the left kidney region leading to the development of a varicocele, which is, of course, of ill omen under such circumstances, it is unusual to meet with men over forty getting any trouble from the venous dilatation, and in

[illegible] the condition is practically never seen, so that we may take it that varicocele retrogresses after the prime of life has been passed.

Proposed [illegible] compulsory to repel candidates for the services if they suffered from varicocele, from fear of future disability owing to real or protracted pain, but if it has given no trouble before twenty-five it is not likely to do so afterwards.

The operation of ligature and removal of the veins for time-absent [illegible] is [illegible] the immediate mortality [illegible] at most be far below 1 per cent. But it is by no means certain that cure will be obtained. Cotter and Nitch examined, at considerable period after the operation, a hundred cases of varicocele. They found that in nearly one-fifth there was recurrence, and that 1 per cent. of the patients were actually worse after the operation, so that they now had symptoms which previously were not present. The following table sums up the results.

VARICOCELE CONSTRICTED VARICOSE VEINS EXAMINED SEPARATELY

[illegible]	90	[illegible]	8	[illegible]	2
[illegible]	55	[illegible]	13	[illegible]	50
[illegible]	24	[illegible]	2	*Not [illegible]	
Not [illegible]	30	[illegible]	14	[illegible]	26
		[illegible]	3	*Worse	1

Even the above table does not quite complete the list of unfortunate consequences. The writer has seen or conversed with two patients operated upon by variouts surgeons, in which so many vessels were taken away that the testis became gangrenous and had to be removed. Suppuration occasionally occurs.

We conclude, therefore, that operation should only be recommended for varicocele when it is genuinely a nuisance to the patient by causing pain which a suspensory bandage is not sufficient to relieve, and that in operating care should be taken to leave the testis an adequate blood-supply.

References.—Cotter and Nitch, *Brit. Med. Jour.*, 1909, i, 191.

J. Rendle Short.

VARICOSE VEINS. It is almost too well known to require comment, that in addition to the aching pain so often complained of varicose veins may also lead to ulceration, eczema, rupture, or thrombosis. In rare cases a fatal result may follow from hæmorrhage or pulmonary embolism after thrombosis. There is no tendency to natural cure, except that the varicose veins of pregnancy improve very much after delivery. Thrombosis may leave the leg permanently œdematous.

It is difficult to estimate the probability of fatal embolism after

thrombosis of a vein in the leg. And typical cases are relatively infrequent, and the risk is less than 1 per cent. if the patient takes proper precautions. The greatest danger is after the first week, when the clot is adhesive, and before the fourth, when it is organized and adherent. Massage and movements increase the risk.

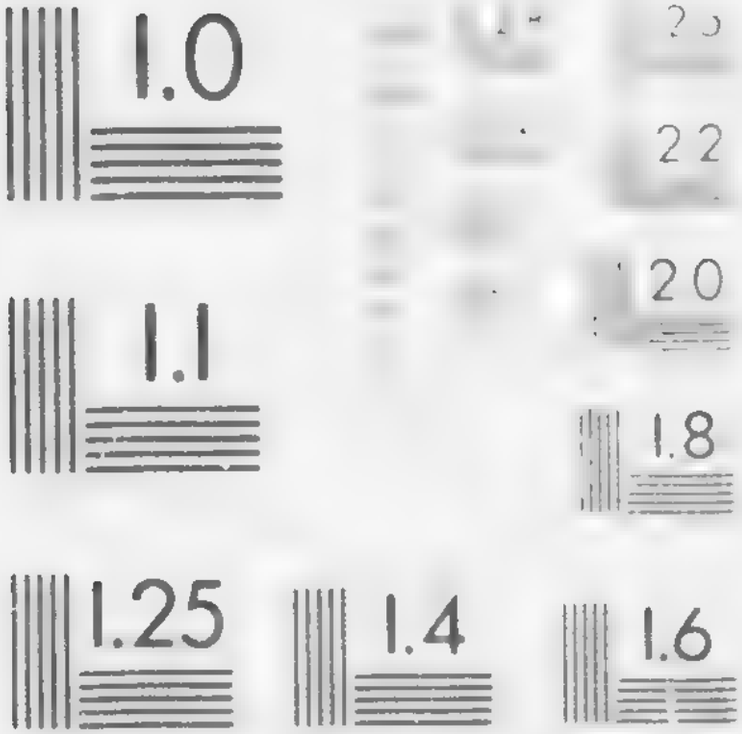
There are three well-recognized methods of operation for the cure of varicose veins: (1) *Removal and ligature vein by vein*; (2) *Trendelenburg's operation*, division and ligature of the saphenous vein in the groin; (3) *Schede's operation*, a circumferential cut being made at the ankle, round the leg just below the knee, and all the veins dissected and tied.

1. **Removal and Ligature Vein by Vein.** The objection to the first method is that it is a long and tedious operation if the veins are numerous. The results for the years immediately following were dependent upon the thoroughness of the surgeon. Many of the veins not rarely trouble again after seven to ten years, from the development of a further crop of veins, and then, in spite of combining the removal with Trendelenburg ligature. It is not common, however, for the patient to need a second operation. Jacobson, in his report to the French Congress of Surgery in 1910, found complete cure in 52 out of 70 cases, that is, 74 per cent. When the whole saphenous vein, its tributaries, were removed, 70 out of 77, 95 per cent., were cured.

2. **Trendelenburg's Operation.** It is possible to obtain more definite evidence of the effects of this operation, and of Schede's, proceedings as they do upon a more stereotyped plan. Goethel has made a personal study of 60 cases operated on by the Trendelenburg method in von Bruns' clinic. Of these, 84 per cent. were cured as far as symptoms were concerned, but only 27 per cent. were free from varices. In 47 cases the saphenal vein had been restored, in spite of division and ligature. He also collected the results of 1425 literature cases, with cures in from 56 to 85 per cent. Miller followed for periods of from six months to ten years 41 cases operated on by the same method in Halsted's clinic. The patients were pretty equally distributed over the various years. Of 19 cases followed 1 to 4 years, 89 per cent. were cured; of 19 cases followed 5 to 8 years, 63 per cent. were cured. This shows the danger of late return of the trouble. Jacobson reported only 56 per cent. cured out of 697 cases treated by the Trendelenburg operation, and followed from two months to twelve years. When this was combined with removal of the prominent varices, 60 per cent. out of 95 patients, followed up to fourteen years, were cured. It is probable, however, that the worst type of cases were treated by this method.

3. **Schede's Operation.** The results of this operation were much less satisfactory, though the evidence was slender. Only 3 out of 9 patients were cured, and two of these were quite recent. Oedema of the leg followed several times. It was interesting to find that the veins, in spite of division and ligature, reunited, photographs showing them

MICROCOPY RESOLUTION TEST CHART



[illegible]

[illegible]

[illegible]

[illegible]

VARIOLA. [illegible]

VOMITING OF PREGNANCY. [illegible]

[illegible] to hospitals [illegible] of the [illegible] often with [illegible] result to the patient. Many cases from hospitals [illegible] and [illegible] to [illegible] with [illegible].

The general features which should be used [illegible] are the following:

1. *The loss of weight* should not be allowed to exceed [illegible] of the total body weight. This is, however, of little use when, as often happens, the initial weight is unknown.

2. *The urinary examination*, though not always reliable, when performed regularly and showing an increasingly high ammonia coefficient, with a diminished quantity of urine in the twenty-four hours, points to an aggravated condition. If saline injections are being employed, this will tend to keep up the quantity of urine passed.

3. *The pulse* probably forms one of the best guides. Many authors advise emptying the uterus when the pulse-rate exceeds 100 per minute in cases which are being treated by absolute rest and low diet. Certain observers, however, insist that a pulse of even 120 is not by itself of grave import.

4. *The vomiting*, when persistent, and accompanied by wasting and a rise in temperature, is to be taken into account. Many cases cease vomiting toward the end, and what is often looked upon as an improvement is in reality an indication of approaching death.

5. *Delirium* and *diarrhœa* are indications of great danger.

In toxæmic cases which do not react to ordinary measures, recourse must be had either to thyroid extract, suprarenal extract, or blood serum. But little time should be lost on these measures. If within 36 to 48 hours there is no improvement, emptying of the uterus is indicated without delay. These patients are by this time in too feeble a condition to stand a large or prolonged operation; consequently, from the point of view of prognosis it is most important that the quickest and least brutal method should be employed. At such a stage of pregnancy this is undoubtedly a vaginal hysterectomy, by which the uterine contents can be rapidly removed. Equally important, too, is the anæsthesia employed. The condition of acidosis, resulting from the starvation of vomiting, precludes absolutely the use of chloroform. The best anæsthetic in such cases is a combination of gas and oxygen, but ether may be used where the former is for any reason not available. It too frequently happens that the emptying of the uterus has been successfully accomplished, but the patient dies from shock or from delayed chloroform poisoning.

Vomiting of pregnancy is not an uncommon affection. Robert Barnes himself saw 9 patients succumb to it. The mortality of the hyperemesis variety is variously given as 60 per cent by some authors and 30 per cent by others.

VULVA, CARCINOMA OF.—The growth in the majority of cases is an epithelioma, and conforms to the characters of squamous-cell [illegible] [illegible]. It is superficial, position [illegible]

also to lead to its early detection: but unfortunately, the fact that the majority of malignant vulval growths are secondary to leucoplakia vulvæ has resulted in obscuring the onset of malignancy. In order to rectify this tendency, some surgeons insist that it is wise to regard leucoplakia vulvæ as in all respects comparable to leucoplakia of the tongue—that is, as a pre-cancerous state.

A distinction should be made between this group, arising in leucoplakic conditions and mainly involving the labia, and that group arising in an otherwise healthy vulva, and usually situated in the neighbourhood of the clitoris and urethra, for the former is more amenable to treatment.

The factors mainly influencing prognosis, and requiring more special consideration are, (1) *The site of growth*; (2) *The stage of advancement when first seen*; and (3) *The treatment adopted*.

1. **The Site of the Growth.**—The growths of the vulva are readily divided into two groups. In the first place there is the smaller group arising in the vicinity of the clitoris, in a frenal fold, where it forms a small nodular mass covered with unaltered skin. The proximity of the growth, on the one hand to the bone, which limits the extent of resection, and on the other hand to the urethra, which is often preserved with undue risk of recurrence, both affect the prognosis adversely. Further, the rich lymphatic drain of this region promotes deposits in the inguinal glands of both sides.

The second and larger group comprises those arising in the labia: here the margin of tissue is a little greater. These cases generally develop in a pre-existing leucoplakia, and if all cases of leucoplakia vulvæ were regarded with the same suspicion as leucoplakia of the tongue, the chances of early detection and successful treatment of the developing epithelioma would be considerably enhanced. The growths in this region more frequently ulcerate, or show a roughly papillary surface, which renders their nature unmistakeable owing to the clinical features.

2. **The Stage of Advancement.**—It is obvious that with a growth already down to the underlying bone, the chances of recovery are small.

In judging of the gravity of the case, the state of the inguinal glands should be considered. Enlargement of the inguinal group, especially if slight, is by no means an indication of secondary deposits, but is to be regarded as an index of septic absorption until the presence of new growth has been demonstrated microscopically. Considerable enlargement, however, does as a rule indicate malignant deposit; but even in these cases, radical operation offers the best chance of a cure.

3. **The Treatment Adopted.**—Operative procedure in which a wide area surrounding the growth, and also the whole tract of lymphatic drainage, including the inguinal group of glands, are removed, will show better results than will purely circumscribed operations. Many operators, while widely resecting the region of growth, and

also removing the inguinal lymph glands, yet leave the connecting lymphatic tracts, with disastrous results as to recurrence.

Again, if leucoplakia is regarded with due suspicion, and the earliest development of malignant disease is countered by wide resection results will be obtained showing great improvement on those of the present day.

When the growth has recurred, the application of *x* rays, radium, and diathermic cauterization, offer chances of considerable relief from the distress of a fungating ulcerated mass, and in rare instances may even result in a cure. The application of *x* rays and radium is still of too recent a date to permit of the compilation of figures of results, but there is at present no question of the relief afforded in otherwise intractable conditions.

Braden Glendinning.

WAR WOUNDS.—(*See* GUNSHOT WOUNDS.)

WHOOPING COUGH.—The prognosis in this disease will be here considered under the following heads: (1) *Age*; (2) *Sex*; (3) *Complications*; (4) *Special symptoms*; (5) *Physical and social conditions*; (6) *Season*.

1. **Age.**—The Aberdeen figures furnish us with the most trustworthy information on this point. Whooping-cough was made a notifiable disease in that city for the twenty years 1882 to 1900, and details have been published which give the age incidence of the cases and deaths for the last ten years of that period. During those ten years there were 15,093 cases with 722 deaths, a mortality of 4·7 per cent. The following table shows the fatality at the various ages up to five years:

FATALITY ACCORDING TO AGE (ABERDEEN).

Under 1	12·5
1–2	10·1
2–3	3·3
3–4	2·2
4–5	1·6
Over 5	Under 1
" 7	Practically nil

From these figures it follows that whooping-cough is a disease of considerable danger to infants and children under two years. But after that age it becomes much less serious.

Cases treated in hospital show a much higher fatality, because it is the most serious ones which are sent to hospital for treatment. But the same relative severity of the disease according to age still appears in hospital-treated cases, as is shown by the following table, which

[illegible] Metropolitan Asylums Board [illegible] 1911 to 1914.

Ages of patients in the Metropolitan Asylums Board.

[illegible] 1	672	16·5	[illegible]
1–2	1,260	30·2	[illegible]
2–3	[illegible]	7·8	[illegible]
3–4	[illegible]	5·9	[illegible]
4–5	[illegible]	4·6	[illegible]
5–10	1,002	40·0	[illegible]
10–15	[illegible]	4·1	[illegible]
15–20	[illegible]	0·4	[illegible]
20 and over	[illegible]	0·0	[illegible]
Total	4,095	3·13	[illegible]

2. **Sex.** The Aberdeen figures show that the death-rate in this respect for all ages was the same, 1·7 per cent., and that amongst the patients over six years of age there were no deaths amongst the males, though there were several amongst the females.

3. **Complications.** In whooping-cough death is much more often due to some complication than to the virulence of the disease itself. Of these complications the most formidable is *bronchopneumonia*. It occurs in about 13 per cent. of cases treated in hospital, and from 25 to 50 per cent. of these so attacked die.

Convulsions are also extremely serious. According to the returns of the Metropolitan Asylums Board, they are met with in 2 per cent. of the cases. Convulsions are most grave when they occur apart from lung complications, and when they are repeated.

Otitis media arises in about 5 per cent. of the cases.

Cerebral complications are fortunately uncommon. They are highly dangerous, and if not immediately fatal, they often lead to permanent impairment of the functions of some part of the nervous system.

4. **Special Conditions.** As a rule the longer the duration of the catarrhal, the less severe is the paroxysmal stage. The severity of the latter chiefly depends upon the frequency and intensity of the paroxysms. The ability of the child to retain his food has a great influence. Frequent vomiting, which often goes with frequency of paroxysms, retards recovery, and may contribute to a fatal result.

5. **Physical and Social Conditions.** Ill-fed, rickety, and tuberculous children are very bad subjects. Even in a normal child a severe attack of whooping-cough, especially if complicated with bronchopneumonia, may result in permanent thoracic deformity.

[illegible] pathologically diseased. But in such cases [illegible] [illegible] case of [illegible] patient.

Adhesions and enlarged bronchial glands often produce the pressure [illegible]

In the Aberdeen cases it was found that when the average [illegible] was 1.7 per cent. the [illegible] patients in families living in single rooms was 7.8 per cent., in those living in two rooms 5 per cent., in three rooms 1.5 per cent., in four rooms 0.4 per cent., and in five or more 2.2 per cent. This may be taken as evidence that the [illegible] of the patient considerably affects the chances of recovery.

6. **Season.** In Aberdeen it was found that the fatality was highest in the months of February, April, and May—the end of winter and the beginning of the spring (6.5 to 6.9 per cent.). As in other diseases death usually takes place somewhat late in its course, the onset of these fatalities may be referred to the winter or the end of the autumn. On the other hand, the fatality was lowest in October and November (3.8 per cent.), here the onset of the disease was during the autumn or in the late summer.

Whooping-cough, like most of the acute infectious diseases, varies considerably in its virulence from time to time. Thus, in Aberdeen the average fatality for the years 1882 to 1889 was 10.5 per cent., while for the years 1900 to 1910 it was 5.3 per cent. *A. H. Gossage.*

WOUNDS, GUNSHOT. (See GUNSHOT WOUNDS.)

YELLOW FEVER. The mortality of yellow fever varies widely in different outbreaks, but the extensive figures of Berenger-Feraud show it to average 40 to 45 per cent. in the West Indies, on the Mexican Coast, and in West Africa, but to be only about 25 per cent. in the United States, Brazil, and European countries. In mild types it is said occasionally to be as low as 10 per cent.

The severity in individual cases varies from extreme malignancy, causing death in the first two days before the characteristic third stage has developed, down to the mildest cases, in which the disease terminates favourably after two or three days without the development of the most typical symptoms, being consequently liable to be overlooked, although still capable of spreading the infection. In the third stage, beginning with the second rise of temperature after the temporary remission of the fever, the characteristic and serious symptoms appear. The most dangerous are epistaxis, albumin in the urine with diminution of the secretion, which may go on to suppression, always fatal, if it persists for from fifteen to twenty-four hours; hemorrhages, especially the dreaded black vomit, and isolated or bleeding from the mouth; intermittent pulse, with tendency to serious syncope; exanthema, and coma. Recovery may, however, take place after an apparently desperate state has been reached, and convalescence sometimes remarkably rapid. Strychnine, a mixture of sulphur bicarbonate, and a salicylate mixture have been recommended. Intravenous injections of sodium bicarbonate, followed by [illegible] threatening symptoms in cholera, are worthy of trial. *A. [illegible] Russell.*

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